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A Manual of the Medical Botany of North America

Laurence Johnson

Scientific and Medical
Books, and Minerals.
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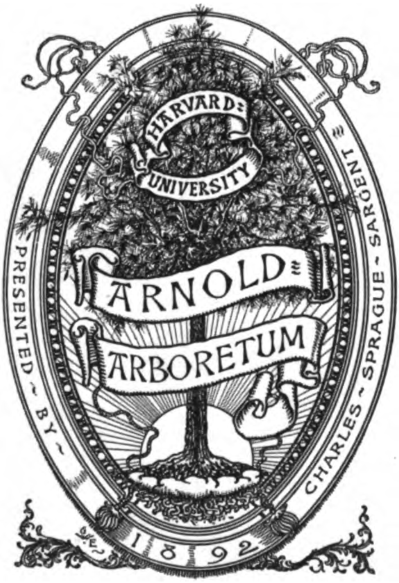

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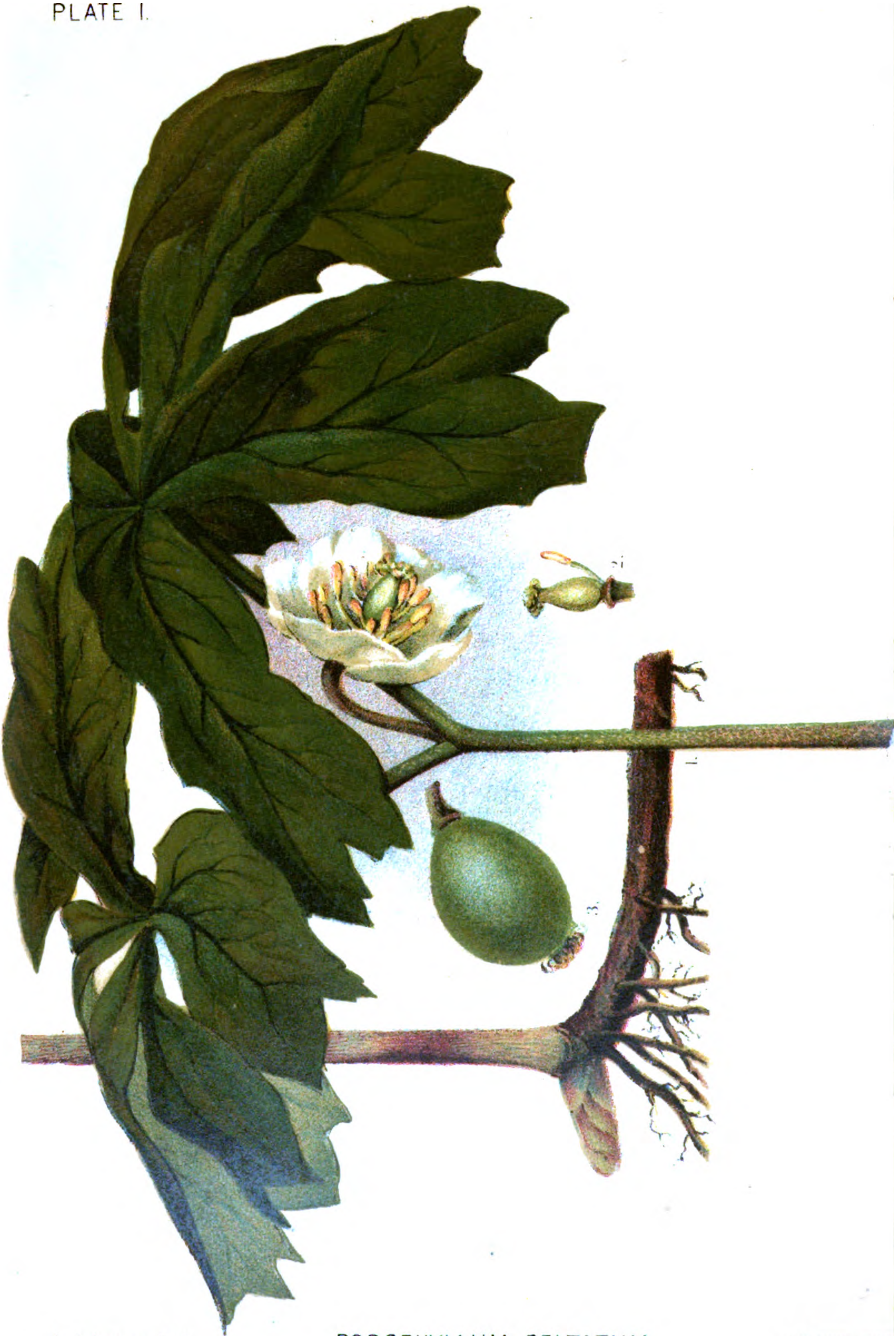
PLATE I.



L. Johnson. Del.

PODOPHYLLUM PELTATUM.

H. BENCKE, LITH. N

Plate I.—(*Frontispiece.*) **Podophyllum peltatum.**

FIG. 1.—Flowering stem and rhizome, natural size.

FIG. 2.—Pistil and stamen, natural size.

FIG. 3.—Fruit, half grown.

DECEMBER

A
MANUAL
OF THE
MEDICAL BOTANY OF NORTH AMERICA

BY

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PREFACE.

For many years medical botany has had no place in most American medical schools; and no text-book on the subject has issued from the American press during a generation.

As a result of this neglect, I believe that vegetable materia medica is taught at a great disadvantage, and often imperfectly. Plants bear relations to each other no less definite than those of the chemical compounds of inorganic substances; and a knowledge of these relations should, in my opinion, precede all attempts at classification of plants as therapeutic agents.

Furthermore, much of the credulity evinced regarding so-called new remedies of vegetable origin is directly traceable to ignorance of plants in general, and of their relations to each other. Let the most extravagant assertions be made concerning the therapeutic activity of any hitherto unused plant—or of one used and long-forgotten—and experimenters immediately busy themselves with it, no matter if other closely allied species are known to be inert. And yet, the different species of a genus are so closely related that when one is demonstrably useless, as a rule, we need not expect much from the others.

As a teacher of medical botany I have been much embarrassed by the want of a text-book suited to the needs of American students—one combining a brief sketch of general botany with descriptions of medicinal plants—and, in this volume, have endeavored to supply that want.

In the first part, or Elements of Botany, I have sketched the life-history of plants from germination to reproduction, explaining the technical terms commonly employed in botanical descriptions and the plan of classification in general use at the present day.

In the second part, or Medicinal Plants of North America, I have presented a systematic arrangement and description of most of the medicinal species, both indigenous and naturalized, which grow upon this continent. I have not, however, endeavored to make the list complete, but rather to exercise a judicious discrimination in selecting the most important. Very many species have been noticed merely to condemn them ; still these often serve a useful purpose as examples of orders or genera.

Under the title, *Character of the Order*, are given the prominent and characteristic features of the order as a whole; and under the title, *Character of the Genus*, the distinguishing characteristics of the genus. In case only a single species of a genus is described, the *character* of the latter is omitted.

Following the *Description* of a species are its *Habitat*, or place of growth, the *Part used* medicinally, *Constituents*, *Preparations*, and a brief account of its *Medical Properties and Uses.*

The words, *United States Pharmacopœia*, following the names of parts used, or of preparations, signify that such parts or preparations are official; and *official*, throughout the work, signifies directed by the Pharmacopœia, the only recognized authority.

Everywhere brevity and conciseness have been aimed at, but nowhere more than in the notes upon the medical properties and uses. Here I have paid little attention to traditions, except when I could trace them to a substantial foundation, believing that, in such matters, a judicious scepticism is wiser than blind credulity. In general, I have summarized the opinions of authors whom I consider most reliable, and have also drawn freely from the records of my own experience and observation.

In the botanical part of the volume, I have followed no author exclusively. Among those whose works I have most frequently consulted are Baillon, Barton, Bentham, Bentley and Trimen, Bigelow, Chapman, Figuier, Gray, Griffith, Lindley, Michaux, Porcher, Pursh, Rafinesque, Torrey and Gray, and Woodville. I scarcely need add that I have had constant access to specimens, both recent and dried ; the latter either in my own herbarium or in that of Columbia College.

The colored plates and a few of the illustrations on wood are from my own drawings and photographs; but for most of the wood-cuts I am indebted to Baillon (*Histoire des Plantes*), Figuier (*Histoire des Plantes*), and Woodville (*Medical Botany*). Those of *Clematis Virginiana* and *Anemone patens*, var. *Nuttalliana*, were kindly placed at my disposal by Professor J. U. and Mr. C. G. Lloyd (*Drugs and Medicines of North America*, now in course of publication).

To my friend Dr. N. L. Britton, of Columbia College, I am much indebted for valuable suggestions, and for affording me every assistance required in consulting the extensive herbarium of that institution; and to my friends Dr. Thomas F. Wood, Wilmington, N. C., and Dr. H. H. Rusby, Detroit, Mich., I extend my thanks for recent specimens required to illustrate the work.

L. J.

323 West 27th St., New York.
December, 1884.

CONTENTS.

PAGE
INTRODUCTION 1

GENERAL PRINCIPLES OF VEGETABLE GROWTH AND REPRODUCTION 2
The Root, 4; Functions of Roots, 8; The Stem and Branches, 9; Functions of the Stem and Branches, 16; Buds and Leaves, 17; Functions of the Leaves, 24; The Flower, 25; Functions of the Flower, 38; The Fruit, 40; The Seed, 44; Classification of Plants, 46.

GLOSSARY OR DICTIONARY OF BOTANICAL TERMS 49

MEDICINAL PLANTS OF NORTH AMERICA.

PHÆNOGAMOUS OR FLOWERING PLANTS.

CLASS I.—DICOTYLEDONOUS OR EXOGENOUS PLANTS.

DIVISION I.—POLYPETALOUS EXOGENOUS PLANTS.

RANUNCULACEÆ 57
Clematis—Virgin's-Bower, 58; Anemone—Wind-Flower, 59; Hepatica—Liverwort, 61; Ranunculus—Crowfoot, Buttercup, 61; Coptis, 64; Hydrastis, 64; Xanthorhiza, 66; Actæa—Baneberry, 69.

MAGNOLIACEÆ 71
Magnolia, 71; Liriodendron, 73.

MENISPERMACEÆ 75
Menispermum—Moonseed, 75.

BERBERIDACEÆ 76
Berberis—Barberry, 76; Caulophyllum—Blue Cohosh, 78; Jeffersonia—Twin-Leaf, 79; Podophyllum—May-Apple, 80.

NYMPHÆACEÆ 82
Nymphæa—Water-Lily, 83.

SARRACENIACEÆ 84
Sarracenia—Pitcher-Plant, 84.

PAPAVERACEÆ 86
Sanguinaria—Bloodroot, 86; Chelidonium—Celandine, 88.

PAGE
FUMARIACEÆ 89
Dicentra, 89 ; Fumaria—Fumitory, 90.

CRUCIFERÆ 92
Nasturtium, 93 ; Brassica—Sinapis, 95 ; Capsella, 96.

VIOLACEÆ 97
Viola—Violet, 98.

CISTACEÆ 99
Helianthemum—Rock Rose, 100.

DROSERACEÆ 101
Drosera—Sundew, 101.

HYPERICACEÆ 102
Hypericum—St. John's Wort, 102.

CARYOPHYLLACEÆ 103
Saponaria—Soapwort, 103 ; Silene—Catch Fly, 104.

MALVACEÆ 104
Althæa—Marsh-Mallow, 105 ; Malva—Mallow, 106 ; Gossypium—Cotton, 107.

LINACEÆ 108
Linum—Flax, 109.

GERANIACEÆ 110
Geranium, 110 ; Oxalis—Wood-Sorrel, 114.

RUTACEÆ 115
Xanthoxylum—Prickly Ash, 115 ; Ptelea—Shrubby Trefoil, 116.

ANACARDIACEÆ 117
Rhus—Sumac, 117.

RHAMNACEÆ 122
Rhamnus—Buckthorn, 122 ; Ceanothus—New Jersey Tea, 123.

CELASTRACEÆ 124
Celastrus—Staff Tree, 124 ; Euonymus—Spindle Tree, 125.

SAPINDACEÆ 126
Æsculus—Horse-Chestnut, Buckeye, 126.

POLYCALACEÆ 128
Polygala—Milkwort, 128.

LEGUMINOSÆ 130
Papilionaceæ, 130 ; Melilotus—Melilot, 130 ; Psoralea, 131 ; Robinia—Locust Tree, 132 ; Tephrosia—Hoary Pea, 133 ; Baptisia—False Indigo, 133 ; Cassia—Senna, 134.

ROSACEÆ 135
Amygdaleæ, 135 ; Prunus—Plum and Cherry, 135 ; Rosaceæ, 137 ; Spiræa—Meadow-Sweet, 137 ; Gillenia—Indian Physic, 138 ; Agrimonia—Agrimony, 139 ; Geum—Avens, 140 ; Potentilla—Cinque-Foil, 140 ; Rubus—Bramble, 141.

SAXIFRAGACEÆ 143
Hydrangeæ, 143 ; Hydrangea, 143 ; Saxifrageæ, 144 ; Heuchera—Alum-Root, 144.

HAMAMELACEÆ 144
Hamamelis—Witch-Hazel, 145 ; Liquidambar—Sweet Gum Tree, 146.

PAGE
ONAGRACEÆ 148
Epilobium—Willow Herb, 148 ; Œnothera—Evening Primrose, 148.

UMBELLIFERÆ 149
Sanicula—Sanicle, 150; Eryngium—Eryngo, 150 ; Daucus—Carrot, 151 ; Heracleum—Cow-Parsnip, 152 ; Archangelica, 153; Cicuta—Water-Hemlock, 513 ; Conium—Poison Hemlock, 154.

ARALIACEÆ........ 155
Aralia, 155.

CORNACEÆ........ 158
Cornus—Cornel, Dogwood, 158.

DIVISION II.—MONOPETALOUS EXOGENOUS PLANTS.

CAPRIFOLIACEÆ 161
Diervilla—Bush-Honeysuckle, 162 ; Triosteum—Feverwort, 162 ; Sambucus—Elder, 163 ; Viburnum—Arrow-wood, 163.

RUBIACEÆ........ 167
Galium—Bedstraw, Cleavers, 167 ; Cephalanthus—Button-Bush, 168 ; Mitchella—Partridge-Berry, 168.

COMPOSITÆ 169
Liatris—Button Snakeroot, 170 ; Eupatorium—Thoroughwort, 172 ; Tussilago—Coltsfoot, 173 ; Erigeron—Fleabane, 174 ; Solidago—Golden-Rod, 175 ; Grindelia, 176 ; Inula—Elecampane, 177 ; Ambrosia— Rag-Weed, 178 ; Helianthus—Sunflower, 179 ; Helenia—Sneeze-Weed, 180 ; Maruta—May-Weed, 180 ; Anthemis—Chamomile, 181 ; Achillea—Yarrow, 181 ; Tanacetum—Tansy, 182 ; Artemisia—Wormwood, 183 ; Gnaphalium—Cud-Weed, 183 ; Erechthites—Fire-Weed, 184 ; Senecio—Groundsel, 184 ; Lappa—Burdock, 185 ; Cichorium—Chicory, 186 ; Hieracium—Hawk-Weed, 187 ; Nabalus—Rattlesnake-Root, 187 ; Taraxacum—Dandelion, 188.

LOBELIACEÆ........ 188
Lobelia, 189.

ERICACEÆ........ 190
Vacciniеæ—Ericineæ—Pyroleæ—Monotropeæ, 190 ; Sub-order Ericineæ, 191 ; Arctostaphylos—Bearberry, 191 ; Epigæa—Trailing Arbutus, 192 ; Gaultheria—Aromatic Wintergreen, 192 ; Andromeda, 193 ; Oxydendron—Sorrel Tree, 194 ; Kalmia—American Laurel, 194 ; Ledum—Labrador Tea, 196 ; Chimaphila—Pipsissewa, 197.

AQUIFOLIACEÆ........ 197
Ilex—Holly, 198.

EBENACEÆ........ 199
Diospyros—Persimmon, 199.

PLUMBAGINACEÆ........ 200
Statice—Marsh-Rosemary, 200.

BIGNONIACEÆ........ 201
Bignonia, 201 ; Catalpa, 201.

OROBANCHACEÆ........ 202
Epiphegus—Beech-Drops, 202 ; Conopholis—Cancer-Root, 203 ; Aphyllon—Naked Broom-Rape.

PAGE
SCROPHULARIACEÆ 203
Verbascum—Mullein, 204; Scrophularia—Figwort, 205; Chelone—Turtle-Head, 205; Veronica—Speedwell, 205.

LABIATÆ 207
Teucrium—Germander, 207; Mentha—Mint, 207; Lycopus—Water Horehound, 209; Cunila—Dittany, 210; Pycnanthemum—Mountain Mint, 210; Hedeoma—Mock Pennyroyal, 211; Collinsonia—Horse-Balm, 211; Monarda—Horse-Mint, 212; Nepeta—Catmint, 212; Scutellaria—Skullcap, 213; Marrubium—Horehound, 214; Leonurus—Motherwort, 215.

CONVOLVULACEÆ 215
Ipomœa, 215.

SOLANACEÆ 216
Solanum—Nightshade, 216; Physalis—Ground Cherry, 217; Hyoscyamus—Henbane, 218; Datura, 219.

GENTIANACEÆ 220
Sabbatia—American Centaury, 221; Frasera—American Columbo, 221; Gentiana—Gentian, 222; Menyanthes—Buckbean, 223.

LOGANIACEÆ 224
Gelsemium—Yellow Jessamine, 224; Spigelia - Pinkroot, 227.

APOCYNACEÆ 228

ASCLEPIADACEÆ 229
Asclepias—Milkweed, 230.

OLEACEÆ 231
Fraxinus—Ash, 231.

DIVISION III.—APETALOUS EXOGENOUS PLANTS.

ARISTOLOCHIACEÆ 232
Asarum—Wild Ginger, 232; Aristolochia—Birthwort, 233.

PHYTOLACCACEÆ 234
Phytolacca—Pokeweed, 234.

CHENOPODIACEÆ 235
Chenopodium—Goosefoot, Pigweed, 235.

POLYGONACEÆ 236
Polygonium—Knotweed, 236; Rumex—Dock, 237.

LAURACEÆ 238
Sassafras, 239; Lindera—Spice Bush, 240.

EUPHORBIACEÆ 240
Euphorbia—Spurge, 241; Stillingia, 242.

URTICACEÆ 243
Ulmus—Elm, 243; Morus—Mulberry, 244; Urtica—Nettle, 244; Cannabis—Hemp, 245; Humulus—Hop, 246.

JUGLANDACEA 248
Juglans—Walnut, 248.

CUPULIFERÆ 249
Quercus—Oak, 249; Castanea—Chestnut, 250.

MYRICACEÆ 250
Myrica—Bayberry, 250; Comptonia—Sweet-Fern, 252.

PAGE

BETULACEÆ 252
Betula—Birch, 252; Alnus—Alder, 253.

SALICACEÆ 253
Salix—Willow, 253; Populus—Poplar, 254.

CONIFERÆ 255
Abietineæ, 256; Pinus—Pine, 256; Abies—Spruce, 257; Larix—Larch, 259; Cupressineæ, 260; Thuja—Arbor Vitæ, 260; Juniperus—Juniper, 261; Taxus—Yew, 262.

CLASS II.—MONOCOTYLEDONOUS OR ENDOGENOUS PLANTS.

ARACEÆ 263
Arisæma—Indian Turnip, 263; Symplocarpus—Skunk Cabbage, 264; Acorus—Sweet Flag, 264.

ALISMACEÆ 265
Alisma—Water Plantain, 265

ORCHIDACEÆ 266
Corallorhiza—Coral-Root, 266; Cypripedium—Lady's Slipper, 266.

HÆMODORACEÆ 269
Aletris—Star-Grass, 269.

IRIDACEÆ 270
Iris—Blue Flag, 270.

LILIACEÆ 272
Trillium—Three-leaved Nightshade, 272; Veratrum—False Hellebore, 273; Chamælirium—Devil's Bit, 274; Convallaria—Lily of the Valley, 275; Polygonatum—Solomon's Seal, 275; Erythronium—Dog's-Tooth Violet, 276.

CRYPTOGAMOUS OR FLOWERLESS PLANTS.

FILICES—FERNS 277
Polypodium—Polypody, 277; Adiantum—Maidenhair, 277; Pteris—Brake, 278; Asplenium—Spleenwort, 278; Scolopendrium—Hart's-Tongue, 279; Aspidium—Shield-Fern, 279; Osmunda—Flowering Fern, 280.

LYCOPODIACEÆ 283
Lycopodium—Club-Moss, 283.

ELEMENTS OF BOTANY.

INTRODUCTION.

BOTANY is the science which treats of the vegetable kingdom.

A science so comprehensive, including everything which relates to plants, from the life history of those low organisms on the border line between the animal and the vegetable world to that of the giant oak which endures for centuries, must of necessity be divided for the convenience of students. Accordingly general botany comprises many well-recognized departments, one of which, devoted to the history of medicinal plants, is known as MEDICAL BOTANY.

But medical botany is also a comprehensive science, for the list of plants possessing greater or less medicinal activity is long, and the plants are, in many instances, so remote and inaccessible that their study is beset with many difficulties. The obstacles, however, in the way of the student who would acquire a knowledge of the medicinal plants of his own country are neither numerous nor formidable. Especially is this true of the medical botany of North America; for though this continent, with its broad extent of territory, varied surface, and extremes of temperature, supports an extensive and interesting flora, the number of medicinal species is surprisingly small, and these are so distributed as to be generally accessible.

The medical botany of North America, then, treats of all plants growing on the continent without cultivation which possess, or are supposed to possess, medicinal activity. It treats of them as living, organized bodies, classifying them according to their structural affinities, and not as they are treated of in the Materia Medica, as mere drugs, arranged according to their real or supposed therapeutic effects.

It will be seen, however, that this classification of plants according to their structural affinities may often afford valuable hints as to the therapeutic properties of allied species. As the comparative anatomist and physiologist, knowing the structure and habits of a single animal of a family, may deduce the habits of an allied species whose structure only is known, so may the medical botanist, knowing the physiological or therapeutic effect of a single species of a genus, draw a reasonable inference regarding the properties of an allied species in advance of experimentation.

GENERAL PRINCIPLES OF VEGETABLE GROWTH AND REPRODUCTION.

A knowledge of the general principles of vegetable life may be acquired by carefully studying the history of any plant, however humble, from the germination of its seed upward through the various stages of its development to the formation and perfection of its fruit.

Take, as a familiar and often-used illustration, a common garden bean (Fig. 1). This seed, we know, is capable, under favorable circumstances, of developing into a plant like its parent, though its external appearance affords no hint of such hidden possibilities. Externally it is covered by a coating of horny hardness, everywhere smooth and glistening save at one point on its slightly concave side, where it was attached to the pod in which it grew. This point of former attachment is marked by a scar, termed the **hilum,** and, as will be shown later, is strictly analogous to the umbilical scar of animals.

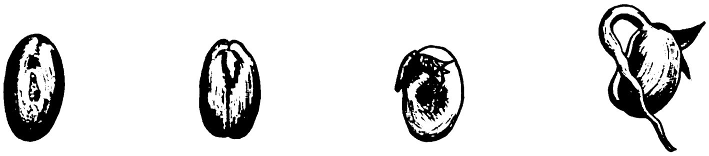
FIG. 1. FIG. 2. FIG. 3. FIG. 4.

FIG. 1.—A bean. FIG. 2.—The same, with seed-coat removed. FIG. 3.—The same, with one seed-leaf removed, showing embryo leaves. FIG. 4.—A bean after germination.

Removing now this external coating, the seed is seen to comprise two similar, symmetrical parts, joined by a small body of like texture, which is folded down along their line of apposition (Fig. 2). A more minute microscropical and chemical examination would demonstrate other features of interest, but foreign to our present purpose.

Protected from moisture a bean may be preserved for years without change, and giving no sign of vitality, but planted in damp earth it speedily undergoes changes which are interesting and instructive. As it absorbs moisture the external coating is ruptured, the two parts of the seed separate along their margins, and the small body joining them elongates (Fig. 4). Moreover, this elongation is always in a downward direction, whatever may be the position of the seed in the ground. There is, however, growth upward at the same time, and soon the seed appears above ground, its two parts diverging and exhibiting between them a bud, which develops a pair of green leaves with an intervening bud (Fig. 5). This bud develops other leaves, and so on, the further upward growth of the plant being but a repetition of the process. In the axils of the leaves buds are also developed, and these grow in a manner similar to that of the main stem, so that the plant assumes a more or less symmetrical spreading appearance.

Returning now to that portion of the seed which elongates downward, we observe that it branches rapidly as it grows, but in an irregular, unsymmetrical manner, differing widely in this respect from the ascending portion, whose branches are axillary and regular. We note also the absence of buds and green color.

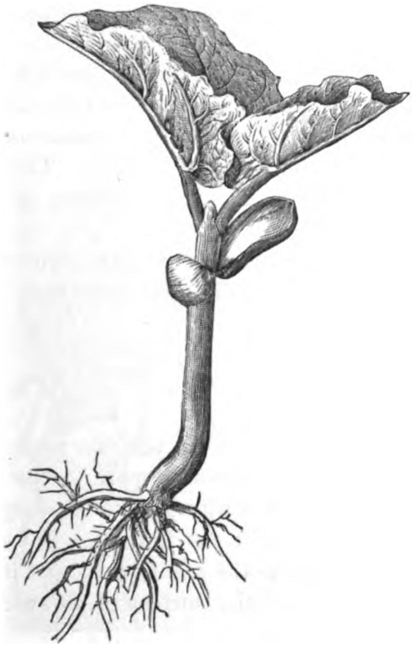

FIG. 5.—A bean with its first pair of true leaves, bearing the seed-leaves above ground.

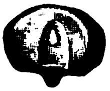

FIG. 6.

FIG. 7.

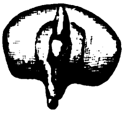

FIG. 8.

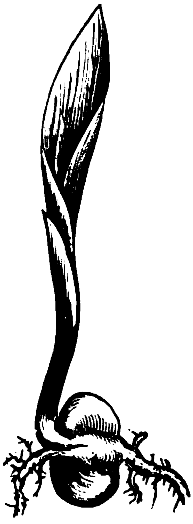

FIG. 9.

FIG. 6.—A kernel of Indian corn, showing the embryo. FIG. 7.—The same, reverse side. FIG. 8.—The same after germination. FIG. 9.—Indian corn with its first leaves.

The downward growth of the plant keeps pace, to a certain extent, with its upward development. Apart from the physiological functions of the roots, the mechanical support which they yield to the stem requires that their development should be proportionate to its growth.

Taking a kernel of Indian corn as another example, we shall find that it too has an external coating similar to that of the bean. Removing this, the seed is found composed of a single body, marked on one side by a longitudinal elevation (Fig. 6), instead of two similar parts as in the bean. Buried in the earth, a kernel of corn absorbs moisture, the little elevation on its side begins to elongate in an upward and downward direction (Fig. 8), one extremity producing a cluster of roots, the other leaves (Fig. 9), the seed itself remaining in the ground, and not borne above it as in the case of the bean.

Without tracing the history of these plants further, enough has been shown to demonstrate that a seed is an embryo plant, as fully fitted for an independent existence when placed under proper circumstances· as is the infant mammal when it issues from its mother's womb. The requisite circumstances are in the one case, first of all, air to breathe, in the other, moisture and seclusion from light.

Having seen how a plant starts on its course of development from the seed, we will now proceed to study the organs by means of which its various functions are performed.

THE ROOT.

The root of a plant is its descending axis. In the vast majority of instances it fixes the plant in position and gives support to the stem, but not in all, for there are many aquatic plants whose roots are suspended in the water, taking no hold upon the soil at the bottom. But even here they give a certain amount of steadiness to the plant, and assist it in maintaining a comparative equilibrium when the surface of the water is disturbed by waves or currents.

Roots present themselves in many different forms, and as these are often made use of in botanical descriptions, it is necessary for the student to familiarize himself with, at least, the leading ones.

The simplest form of the root is that which grows directly downward from the embryo, giving off but few lateral branches, and these of comparatively small size; this is known as a **tap-root.** The beet, turnip (Fig. 10), carrot, and radish, among herbs, are familiar examples in which the tap-root attains a great development while its lateral branches are insignificant. In many forest trees the main root penetrates the earth to a considerable depth before lateral branches of important size are given off. Such trees, however, never have tap-roots of as proportionably great size as many herbaceous plants, for two reasons: plant food is more abundant near the surface, and the greater the depth the more compact the soil and the more difficult for the roots to penetrate. Hence it occurs that most forest trees which start in life with strongly marked tap-roots have, at a later period, lateral roots of a greater size than the main descending axis.

In very many plants, instead of a single root growing downward from the root-end of the embryo, there are produced a cluster of roots at once, as in the Indian corn : such are denominated **fascicled roots.** To this class belong the grasses and very many herbaceous plants whose rapid growth depends largely upon their abundant roots.

Such are the two main forms of primary roots—that is, roots growing directly from the seed ; but of course they are subject to many modifications. We are to consider the beet, turnip, and carrot, as presented to us in cultivation, only as exaggerated forms of tap-roots, due chiefly to natural habit but largely also to man's intelligent propagation. A somewhat similar exaggeration of fascicled roots is seen in the common dahlia (Fig. 11). This plant starts on its course with a fascicle of roots which, later on, become thickened for some distance below their junction with the stem.

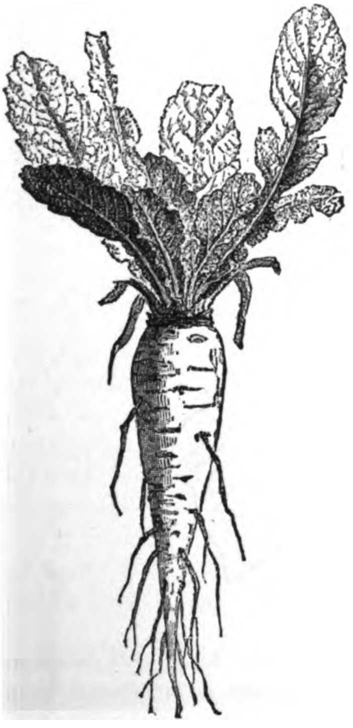

Fig. 10.—A turnip—tap-root.

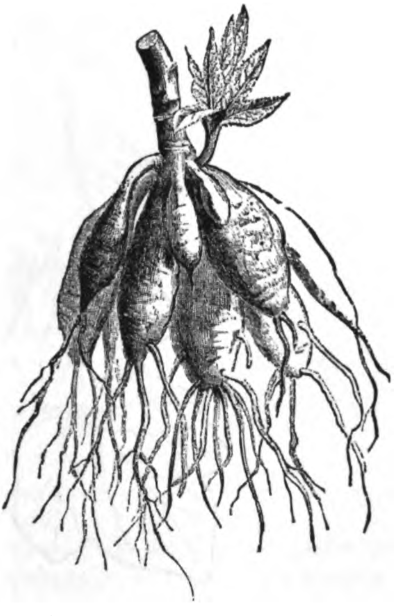

Fig. 11.—A dahlia—thickened fascicled roots.

As will be seen later, these various modifications of the primary forms of roots have an important bearing upon plant life, and, incidentally, often serve as the storehouses from which are drawn valuable medicinal agents.

In addition to the primary roots growing from the seed, nature has endowed many plants with the power of putting forth roots as occasion may require from any part of the stem, or even, in some instances, from the leaves, thus giving them a double hold on life: such are denominated **secondary** or **adventitious roots.** The common strawberry of our gardens will serve as an illustration of one kind of adventitious roots. This plant produces "runners," which put forth roots at the point where they touch ground, then a cluster of leaves, and a new plant is formed. The stems of the running blackberry (*Rubus Canadensis* L.) often root freely also, and form a netting for the feet of the unwary. Very many illustrations of plants endowed with this power might be found anywhere about us, but it remains for the skilful gardener to develop it to its fullest extent, as his cuttings of roses, geraniums, and indeed of almost all his rarest and most beautiful blooming plants abundantly testify.

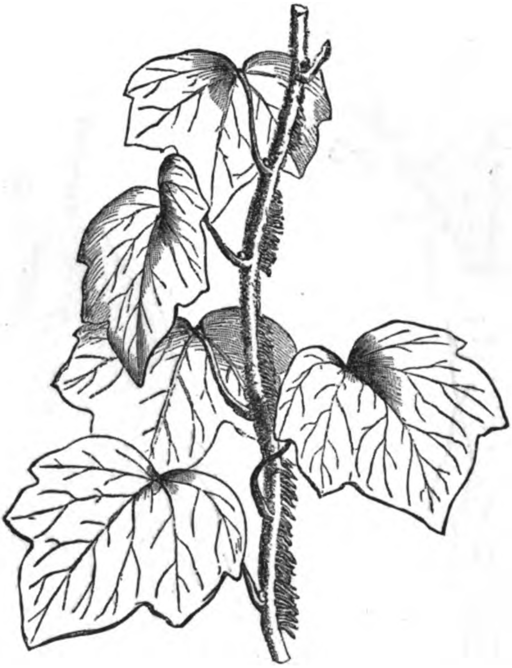

FIG. 12.—Common ivy (*Hedera Helix*), with adventitious roots.

Such adventitious roots are, however, true roots, which perform the ordinary functions of such organs. There are other adventitious roots of an entirely different character. The stem of the poison ivy (*Rhus Toxicodendron* L.), when growing beside some object to which it can cling, puts forth roots in innumerable numbers which do not contribute in any degree whatever to the nourishment of the plant, but merely afford mechanical support. Moreover, these roots appear to be produced in response to the stimulation of contact with a supporting surface, in the same manner as the adventitious (true) roots of the strawberry runner are called forth by contact with the damp earth. Of this kind of adventitious roots many illustrations might also be adduced; one more will suffice, the common ivy (*Hedera Helix* L.) (Fig. 12).

Some plants produce a kind of adventitious roots by which they attach themselves to other herbs or shrubs and draw their nourishment from them. The common dodder (Fig. 13) will serve as an illustration. The seeds of this plant germinate in the ground; the stems grow until some suitable support is reached, then twine about it and put forth a sort of rootlets by means of which nourishment is drawn from the supporting plant. Then direct communication with the earth is cut off by the death of the stem below the adventitious rootlets, and the plant thenceforth lives as a true parasite.

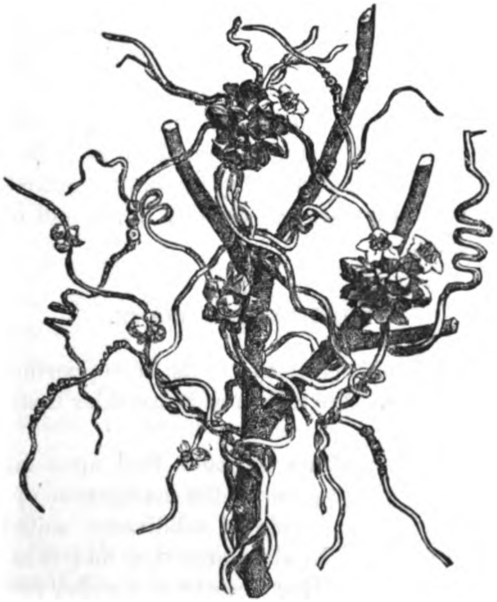

FIG. 13.—Dodder (*Cuscuta*), parasitic upon another plant.

The general structure of the root does not differ greatly from that of the stem. In both there is bark, woody tissue, and pith, though the last-named is seldom very distinct in the root. In their modes of growth there is, however, considerable difference. As already shown, the stem branches according to a fixed and regular plan, and, as will be seen later, while still young elongates between the branches. In the root, on the contrary, branches issue irregularly and elongation is limited to the growing extremity. In other words, a root of a given length, once laid in the soil, never elongates by intercellular growth, but only increases its length by additions to its growing extremity. Its increase in diameter is accomplished in the same manner as that of the stem.

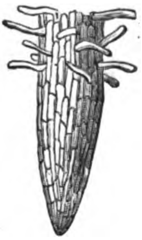

FIG. 14.—The growing extremity of a root, with root-hairs. Magnified.

Without entering too minutely into the structure of the growing extremity of the root, it is necessary to observe that this is made up of a mass of cells which multiply rapidly and are constantly building up tissue (Fig. 14) in a forward direction. They are, moreover, endowed with the power of rapid absorption, and are, in fact, the innumerable mouths which feed the growing plant. In order to increase the absorbing surface of the roots, the younger ones are provided with elongated cells, commonly called **root-hairs.** Though of microscopic size, these are produced in such infinite numbers as to be of immense service. As, however, they are only required during the period of active growth, they are not evident in autumn after the season's work is accomplished.

FUNCTIONS OF ROOTS.

The mechanical functions of the roots in supporting the stem have already been alluded to. We have now to consider their other important offices.

As animals feed upon plants, so plants feed upon minerals. And as they are not provided with organs for the mastication of their food, they must necessarily receive it in a state of subdivision suited to their needs and powers of absorption. In this form they find it in the damp earth which their roots penetrate. Every rootlet is a seeker for food and every growing cell is hungry. Water, with gases and mineral salts in solution, is greedily sucked up and carried toward the sunlight for elaboration.

Roots are, moreover, endowed, to some extent, with the power of selecting the proper nourishment for the plant which they feed, and they will take this or nothing. The most careless farmer has learned that he cannot successfully raise the same crop on a field year after year without fertilizers. The explanation is simple. Suppose corn be planted year after year in the same ground. The roots of each succeeding crop find less and less nourishment, until finally partial or complete starvation results. And this occurs, too, while there may be still plenty of food fit for other plants.

Hence the rotation of crops, a principle at the foundation of successful farming, depends upon the selective powers of roots.

But all plants are not fixed in the soil and do not draw their nourishment from it. Many aquatic plants float in the water; these find their proper food in that element. Others are parasitic upon the stems or roots of other plants, their roots penetrating the bark and sucking up the juices already elaborated for their needs. To this class belong the beech-drops (*Epiphegus Virginiana* Barton), parasitic upon the roots of the beech, and American mistletoe (*Phoradendron flavescens* Nuttall), a woody parasite upon the branches of forest trees, common in the Southern States.

Still other plants are mainly nourished by roots which hang in the air. These, called air-plants, are almost exclusively inhabitants of warm, moist regions.

Another important office of some roots is to serve as storehouses of nourishment for the future needs of the plant. The great mass of plants are **annuals,** living but a single season, during which they germinate from the seed, attain their full development, flower, produce fruit, and die. These have no need for a reserve store of nourishment, hence their roots are fibrous and not thickened.

But many plants, termed **biennials,** germinate from the seed in spring, produce a cluster of radical leaves, and develop a very large tap-root during the first season. The next spring, drawing upon the store of nourishment laid up in the root, they send up vigorous flower-stems, produce seed, and die. Many such roots, as the beet, carrot, and turnip, are of great importance as articles of food.

Plants which endure for several years, termed **perennials,** not unfrequently have roots of the same character. These thickened roots in many instances contain the active medicinal principles of the plants.

THE STEM AND BRANCHES.

We have seen that the stem is the ascending axis of a plant; that it grows upward toward the light at the same time that the root is developing in an opposite direction. We have now to consider more particularly its mode of growth and some of its more common forms.

In the case of the bean it was observed that after the seed-leaves came a pair of green leaves (Fig. 5); after these another pair, and so on. The points where these leaves appear are termed **nodes** or **joints,** and the spaces between them **internodes.** Now, during the earlier stages of growth the internodes increase both longitudinally and in diameter also by cell-proliferation, so that though two nodes of a growing shoot may, when their leaves first unfold, be quite close together, in the end we find them separated by an interval of perhaps several inches. In this particular, as stated above, the growth of the stem differs greatly from that of the root.

Again, it was noted that in the axils of the leaves were buds which normally developed into branches subject to the same laws of growth as the main stem. We have now only to suppose that these axillary buds keep pace with the development of the main stem, and every opposite-leaved plant would assume a regular, symmetrical shape. But practically the vast majority of such plants are unsymmetrical, mainly because the **terminal bud**—that is, the bud terminating the main stem—is so much more vigorous than the others, that having the start in the beginning it keeps it and leaves the branches with comparatively little nourishment. In many plants the growth of the terminal bud is so vigorous that the axillary buds never unfold and the stem remains always simple—that is, not branched.

But suppose some accident destroys the terminal bud: then the axillary buds, especially those nearest the seat of the injury, are quickened into activity, and a plant whose stem is naturally simple becomes branched.

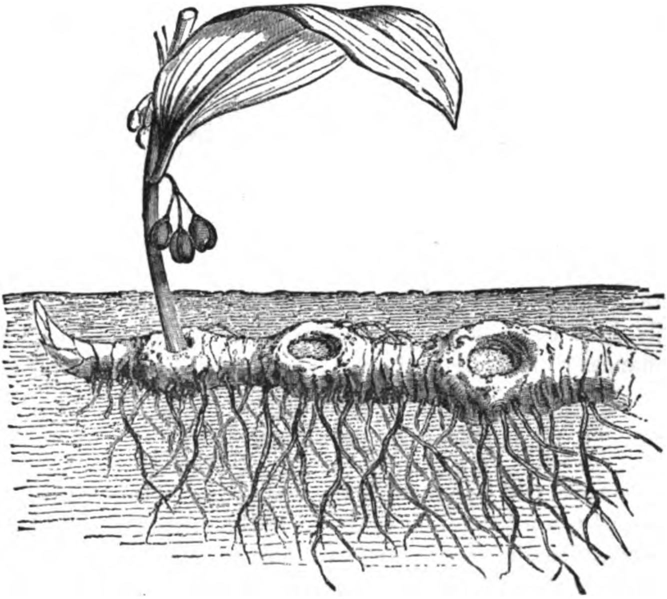

FIG. 15.—Solomon's-seal—a subterranean stem (*rhizome*). Leaf parallel-veined.

Again, some plants in germination have not one or two seed-leaves only, but a cluster of them; in these the branches normally assume a verticillate character. This is the rule in the pine family (*Coniferæ*). Others still which start with their leaves in pairs, at a later stage produce them alternately; here the branches are also alternate. And some plants have forking branches, the growing bud ceasing activity at a certain point and a pair of forking branches starting from the axils of the last developed leaves.

This brief view of the growth of the stem and branches demonstrates sufficiently that every plant in its development obeys a fixed law of its being. Yet from a few primary forms arises endless diversity!

Many of the forms of stems have received distinctive names, which are made use of in botanical descriptions, as **simple,** not branched; **erect,** growing straight up; **ascending,** arising obliquely; **twining,** climbing by twining about some support; **prostrate,** lying flat on the ground; **trailing,** running along over the surface of the ground or other plants, etc.

Thus far we have studied the stem as it ordinarily appears to us above ground, but there are stems of vast importance which are wholly subterranean and are commonly spoken of as roots. That of Solomon's-seal (Fig. 15) will serve as an illustration of one form of such stems. Placed just beneath the surface in a horizontal position, it appears as a thickened, fleshy, root-like body, bearing numerous rootlets, a terminal scaly bud at its anterior extremity, and sending up a flower-stem, behind which are scars left by the falling away of previous ones. Each year a new joint is added, while commonly the oldest one rots away; hence the stem is slowly, year by year, creeping forward. Such an underground stem is called a **rhizome.**

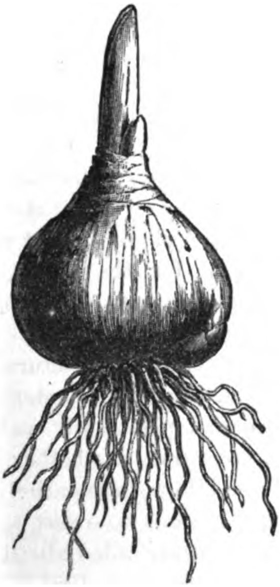

FIG. 16.—Hyacinth bulb.

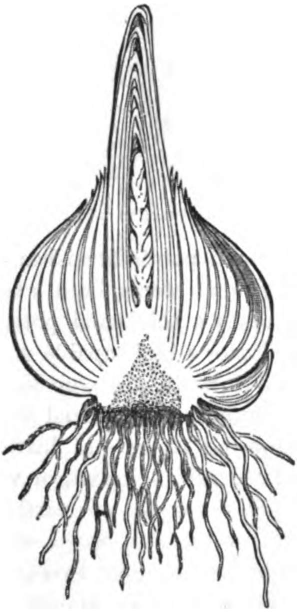

FIG. 17.—Vertical section of a hyacinth bulb.

Rhizomes present many different forms. They are simple or branched, horizontal or ascending, fleshy, etc., and are perennial. Podophyllum, sanguinaria, and iris are among our active medicinal plants which have stems of this character.

In general, rhizomes contain the more active principles of the plants, and in the greatest proportion. As such plants store away a great amount of nourishment in their fleshy stems for the succeeding year's needs, they commonly make vigorous growth early in spring, and are mostly early bloomers.

Another common form of subterranean stem is the **bulb**; that of the hyacinth (Fig. 16) affording a good illustration. A vertical section (Fig. 17) explains its character perfectly. It is made up of fleshy scales (reduced leaves), arranged in regular order, which gradually take on the form of true leaves toward the centre and enclose the flower-stem. The onion (Fig. 18) has a similar structure.

Bulbs also present themselves in diverse forms, as the scaly and fleshy. One form, which is solid and of more or less homogeneous structure, not made up of scales, is termed a **corm.** That of the Indian turnip (*Arisæma triphyllum* Torrey) is of this character.

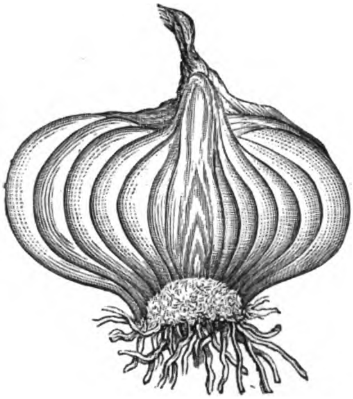
FIG. 18.—Vertical section of an onion.

Many of these underground stems multiply by division or offshoots. The hyacinth, for example, forms bulblets in the axils of its scales, which develop into new plants. And many creeping rhizomes send up aërial stems from nearly every joint. It should not be forgotten, however, that all such plants grow from the seed originally, in the same manner as those having only aërial stems.

The common potato furnishes a curious example of a plant with aërial and underground stems, both well developed; for the potato, termed a **tuber,** is really a thickened portion of a subterranean stem, and each of its so-called eyes a bud capable of developing into a new plant.

Stems, like roots, are *annual, biennial,* or *perennial.* Naturally all annual roots support only annual stems, but all subterranean stems send up annual flowering stems and leaves. Perennial plants are spoken of as **herbaceous, suffruticose,** or **woody,** according to whether they have annual stems, those that are partly woody and do not die entirely down to the ground, or those of wood sufficiently vigorous to resist the winter. Woody plants under about twenty feet in height are called **shrubs;** when of greater height they are known as **trees.** This distinction is, of course, somewhat arbitrary, and a given specimen may be spoken of as a shrub or small tree.

In structure stems are composed of bark, wood, and pith; and the manner in which these three are arranged, with their relations to each other, serve as the basis of the division of flowering plants into two great classes, namely, the **exogenous** and the **endogenous.**

Exogenous plants have their bark, wood, and pith each distinct, as shown in the cross-section of the stem of an oak (Fig. 19), in which the central stellate portion is the pith, the external dark zone the bark, and the intermediate part the wood. The proportions of the three vary greatly in different plants, but their relative positions are always the same in exogenous stems.

Their structure deserves more attention than we can give in this place, but must receive at least a passing glance.

Pith is but an aggregation of thin-walled cells, originally spherical in shape but become polyhedral by mutual compression (Fig. 20). In other words it is merely cellular tissue, with feeble vitality and short-lived. Though active in the young and growing shoot, it soon becomes inert, and not unfrequently decays long before the plant reaches its term of existence. It is commonly more abundant proportionately in herbs and suffruticose plants than in woody perennials. In some rapidly growing woody perennials, however, the young stems have a very large proportion of pith, as seen in the ailanthus (Fig. 21). As it exists in most exogenous stems, it might very properly be viewed solely as a relic of their infancy.

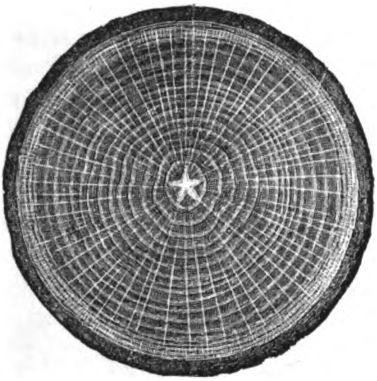

FIG. 19.—Cross-section of the stem of an oak.

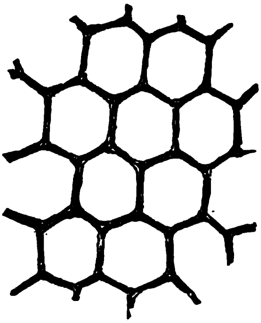

FIG. 20.—Cellular tissue (pith). Magnified.

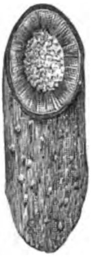

FIG. 21.—Oblique section of one-year-old stem of ailanthus.

During the stage of its active growth, the pith of some plants abounds in mucilaginous principles, that of the young shoots of sassafras being especially marked in this respect, and being considerably used in medicine on this account.

Wood also possesses a cellular structure, but the cells are of a different shape from those of the pith, and are differently arranged. They are commonly elongate-cylindrical, tapering at each end, placed side by side, and overlapping at the ends (Fig. 22) in such manner as to form more or less tough, strong fibres. In early youth they have transparent walls, and thus permit the ready ingress and

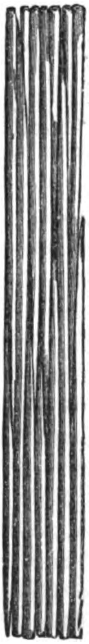

FIG. 22.—Wood-cells. Magnified.

egress of liquids by osmose. Later their walls become thickened by the deposition of cellulose, etc., and lose their transparency. The wood-cells of some plants are of a characteristic form, which may serve, as in the coniferæ, for the identification of the order.

But inspection of a cross-section of almost any exogenous stem will show that the woody tissue is not uniformly solid throughout, but is traversed by many small canals (Fig. 23). In some stems, as that of the grapevine, these are so large that one can readily draw water through them by suction with the lips. These canals are called **ducts or vessels,** and are formed from large cells placed end to end, the cell-walls at their point of contact afterward being absorbed.

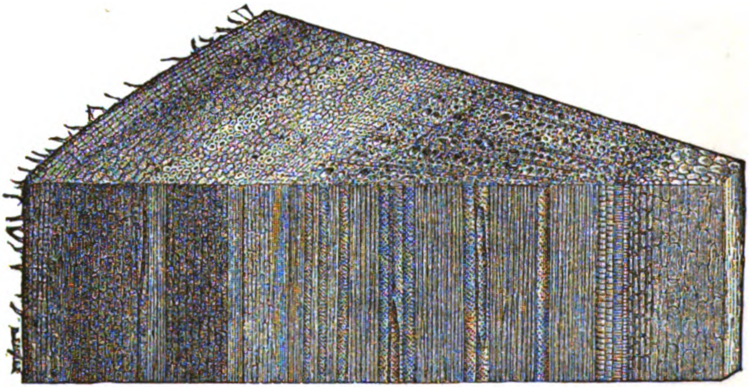

FIG. 23.—Horizontal and vertical section of the stem of a maple. Magnified.

Nor is this all. A longitudinal section of many stems shows glistening plates of tissue traversing the wood from the pith toward the bark; these plates, called **medullary rays,** are formed, like the pith, of cellular tissue, and serve as a means of communication between the pith and the external growing surface of the stem (Fig. 24). The medullary rays of oak and sugar-maple are highly developed, forming the so-called satin grain of the wood.

Inspection of a cross-section of any exogenous stem of a few years' growth will show that the wood is made up of **concentric rings** (Fig. 19). These rings represent annual accessions to the wood previously formed, each one comprising the growth of a year. Each is complete in itself, and, though more or less strongly adherent to the one which it encircles, evidently is, at the time of its growth, the only growing part of the stem. Once formed, these rings afterward undergo but slight changes in character, and never any in volume. As years pass by they become more dense, and generally more or less deeply colored by the deposition of coloring matters. Hence, after a few years' growth most exogenous stems present in cross-section a central colored portion, termed heart-wood or **duramen,** surrounded by a lighter zone of sap-wood or **alburnum,** the latter deriving its name from the fact that the sap still circulates through it, while the former no longer possesses vital activity, and like the pith may, and often does, decay without impairing the vigor of the plant.

From the foregoing it becomes evident that the proliferation of wood-cells is only to be found in progress upon the outside of the wood already formed, just underneath the bark. As aggregated here, these young growing cells form what is termed the **cambium layer.** This layer is commonly of a mucilaginous character, and during the period of its greatest activity permits the bark to be readily separated from the stem.

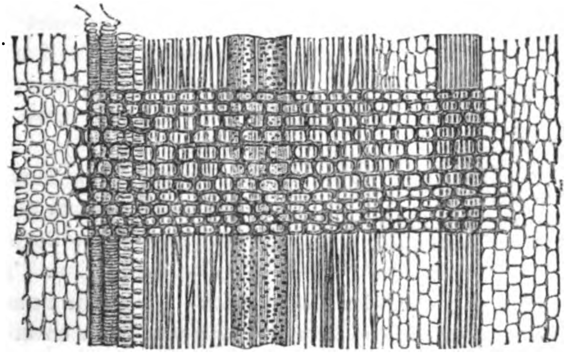

FIG. 24.—Vertical section of the stem of a maple, showing the medullary rays. Magnified.

The **bark** is the protective covering of the stem. At first composed, like the pith, wholly of cellular tissue, it later develops wood-cells, particularly on its inner surface, and is divisible into an inner and an outer layer. The inner bark is commonly composed of long wood-cells, termed **bast-cells,** united into fibres often of great strength and toughness, as in flax and hemp. The outer bark is composed largely of cellular tissue, and presents two layers, the inner green, the outer corky; the latter being covered when young with a delicate epidermis. Like the wood which it covers, the bark increases in thickness each year, but in a reverse manner. That is to say, while the wood increases by growth upon its outer surface, the bark thickens by deposition of new material upon its inner side; and while the wood is continually dying from within outward, the bark is as constantly dying and exfoliating from without inward. Moreover, as the stem increases in size the outer bark, being only moderately elastic, is split and broken, and commonly assumes a rugose appearance. In young and very vigorous trees not unfrequently the wood grows so rapidly that the bark cannot keep pace with it, and is consequently split down to the fibrous layer, or even in some instances to the wood itself.

In annual exogenous plants, though the relative positions of the bark, wood, and pith are the same as described above, the pith is relatively large, the woody tissue is arranged with less uniformity, often in wedge-shaped bundles, and the bark has no distinctly corky layer.

Endogenous plants have no central mass of pith entirely free from woody fibres, no concentric rings of wood, and no separable bark. Their wood is in bundles or fibres intermingled with the cellular tissue, and new bundles are continually being formed in the midst of the old during the period of growth. Toward the external surface of the stem the wood becomes condensed and hard, and serves, instead of bark, as a protective covering to the more tender parts within (Fig. 25).

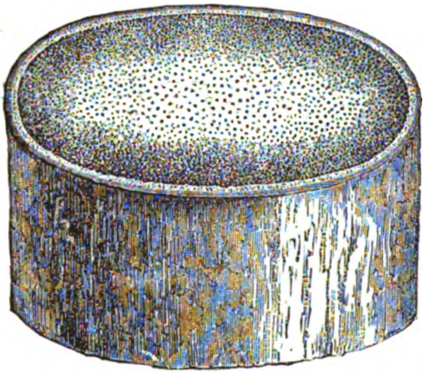

FIG. 25.—Cross-section of the stem of a palm. The outer circle is condensed woody tissue; within, the dots represent bundles of woody tissue imbedded in pith.

Take, as an illustration familiar to all, a stalk of Indian corn, and view it in both longitudinal and cross-section. There will appear an abundance of cellular tissue (pith), but with numerous strong woody fibres interspersed; and though it appears to be covered with bark, this cannot be separated as in the case of an exogenous plant, since it is only condensed woody tissue and shades off gradually into the less compact structure within.

Endogenous plants very commonly have simple stems, though branching ones are not unusual. In temperate regions they are chiefly small plants—the grasses, sedges, and cat-tails are familiar examples—but from their immense number form a very important part of the vegetation. In the tropics many of them, chiefly palms, attain the stature of tall trees.

FUNCTIONS OF THE STEM AND BRANCHES.

The most important function of the stem and branches is to serve as a means of communication between the roots, leaves, and reproductive organs, for to this one function all others are subsidiary.

We may safely assume that a plant's whole energies are bent toward the reproduction of its species. When this is accomplished the annual and the biennial die; the perennial goes a step farther and prepares for a repetition of the process the next year, and then it ceases labor for the season.

The stem and branches, then, supply the channels by which the nourishment collected by the roots is transmitted to the leaves for elaboration and to the reproductive organs for their needs, receiving back merely what is required for their sustenance and growth.

BUDS AND LEAVES.

We have already seen how the stem and branches elongate by the unfolding of the bud, the expansion of leaves, and the lengthening of the spaces between the latter, and have noted that the bud exists in the embryo. From this time forward it always is the growing point of the plant. Examined in vertical section, it is shown to be a collection of embryonic leaves, diminishing in size from without inward. In the growing season the bud is green like the expanded leaves, though of a more tender shade, but as the end of the season approaches the outer leaflets undergo more or less change, including both color and texture, and are not unfrequently coated with resinous or gummy matters to protect them against cold and moisture during the period of the plant's rest. Such altered leaflets are termed **scales.**

We have already seen how leaves are produced. We will now consider their structure, varied forms, and functions.

Leaves, like stems, consist of woody and cellular tissue, the former collected in bundles or fibres which form a skeleton whose interstices are filled up with the latter.

Upon the form of the skeleton, of course, depends the shape and general character of the leaf.

The larger and more prominent fibres of the skeleton are termed **veins,** the smaller ones **veinlets.** In leaves having a large central vein, with less prominent lateral branches, the central one is termed the **mid-vein** or **mid-rib.** Indeed, in botanical descriptions the prominent fibres of the leaf-skeleton are spoken of as **veins, ribs,** or **nerves** indiscriminately, as for example, a leaf is *feather-veined*, *strongly ribbed*, or *triple-nerved*. Little confusion, however, need arise from this misuse of terms if the student but remember that though these fibres bear some analogy to veins and ribs, they bear none whatever to nerves.

A leaf may commonly be distinguished into two parts: an expanded portion, termed the **lamina** or **blade,** and a stalk by which this is attached to the stem, termed the **petiole** or **footstalk.** In case there be no petiole, the blade being attached directly to the stem, the leaf is said to be **sessile.**

Through the petiole, if there be one, or, in its absence, directly into the base of the blade, pass the woody fibres whose ramifications make up the leaf-skeleton. The manner in which the veins ramify is termed the **venation** of the leaf.

In endogenous plants these fibres commonly divide at or near the base of the blade into a number of nearly equal branches, which pursue a parallel or slightly divergent course toward the margin or apex (Fig. 15). Such leaves are termed **parallel-veined**; and here is found one of the distinctions between endogenous and exogenous plants.

In exogenous plants the venation is extremely varied and gives rise to many different forms. In one particular, however, there is uniformity: the ultimate ramifications of the veins produce a net-work; hence such leaves are termed **net-veined,** and are thereby distinguished from the parallel-veined leaves of endogenous plants.

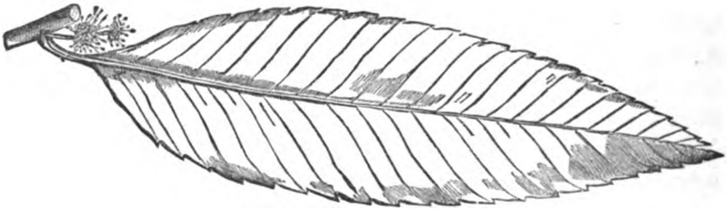

FIG. 26.—Simple, pinnately veined leaf of chestnut. Margin serrate.

One of the commonest forms of exogenous leaves is that in which the mid-vein pursues a direct course from the base to the apex, giving off, at regular intervals, lateral branches which extend parallel with each other to the margin. Such leaves are denominated **pinnately** or **feather-veined.** The leaves of the beech and chestnut (Fig. 26) are familiar examples of this form.

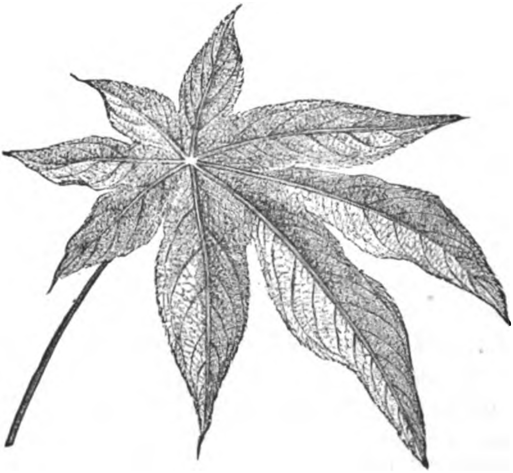

FIG. 27.—Simple, palmately veined leaf of castor-oil plant (*Ricinus communis*).

Another common form of net-veined leaves is that in which there is no strongly marked mid-vein, but instead a number of large veins pursue a divergent course from the base to the margin of the leaf. There may be three, four, seven, or nine of these veins, diverging like the fingers of an outstretched hand or the toes of a bird; hence such leaves are said to be **palmately, digitately,** or **pedately veined.** The leaves of the maple, sycamore, and castor-oil plant (Fig. 27) will serve as illustrations.

Between these two widely different forms of venation in exogenous plants are other connecting ones, as when a leaf has both a mid-vein with more or less strongly marked lateral branches and large diverging, palmate branches also.

Again, upon the venation of leaves depends, to a very great extent, their marginal shape. In parallel-veined leaves the margin is commonly **entire**—that is, not notched or indented; the common grasses, cat-tails, and iris are familiar examples. In very many feather-veined leaves the margin is also entire, as for example the magnolias, laurel, and flowering dogwood, but more commonly they are variously notched or indented. Leaf margins so indented are characterized in botanical descriptions by technical terms which are, for the most part, self-explanatory; as for example (Fig. 28), **serrate,** saw-toothed; **dentate,** toothed, but with teeth less regular than the preceding, and not pointing forward like them; **crenate,** scalloped; **repand, undulate,** or **wavy,** when the margin makes a wavy line; **sinuate,** more strongly wavy or sinuous; **incised, cut, jagged,** etc. Again, when the margin is deeply cut into a definite number of divisions, the leaf is said to be **lobed,** as *three-lobed, five-lobed,* or *seven-lobed.* When cut more deeply than half way to the centre or base, the leaf is said to be **cleft,** and hence the terms *three-cleft, five-cleft,* or *trifid, quinquefid,*

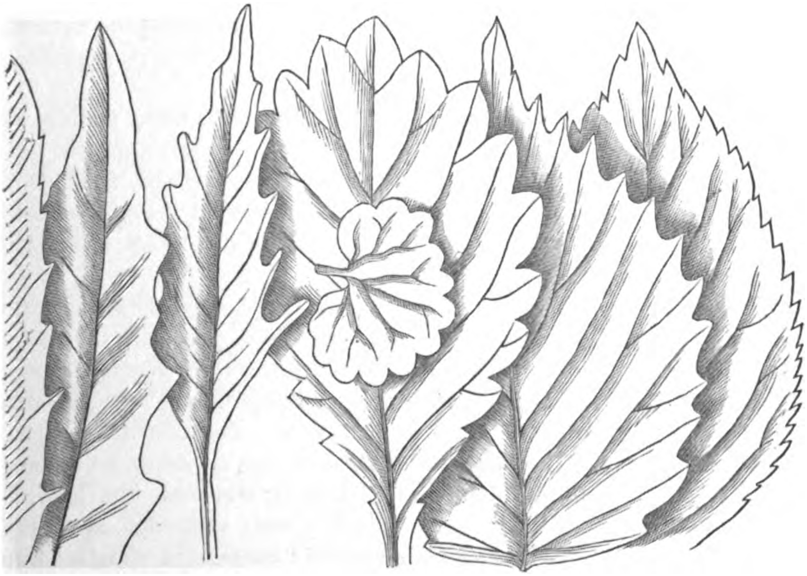

FIG. 28.—Marginal shapes of leaves. Beginning at the right, the first is serrate, second dentate, third between dentate and crenate, fourth crenate, fifth sinuate-toothed, sixth sinuate. Traced from nature.

etc. When the incisions are carried still deeper, the term **parted** is used; and when they extend to the mid-vein or base of the blade, the leaf is said to be **divided.**

In general outline leaves present a multiplicity of forms, which are, however, sufficiently characterized in non-technical language. Such terms as *linear, lanceolate, oblong, elliptical, oval, ovoid,* and *orbicular* are often employed, and require no explanation. *Oblanceolate* signifies a general lance-shape, but somewhat widened toward the apex, like a lance with its point turned downward; *obovate,* an ovate form also with its wider portion toward the apex; *spatulate,* like a spatula; *cuneate,* wedge-shaped, tapering from above downward.

Then, too, the base and apex present a variety of forms. The base may be *cordate* or heart-shaped, *reniform* or kidney-shaped, *auriculate* or eared, *sagittate* or arrow-shaped, *hastate* or halberd-shaped, *peltate* or shield-shaped.

The apex may be *acuminate* or taper-pointed; *acute* when ending with an acute angle and not tapering; *obtuse,* blunt; *truncate,* appearing as if cut off; *retuse,* slightly notched at the extremity; *emarginate,* more deeply notched or indented; *obcordate,* inversely heart-shaped; *cuspidate,* armed with a small cusp or tooth; *mucronate,* armed with a very small sharp point; or *aristate,* with a bristle-like point.

Thus far we have considered the leaf in its simplest form—that is, when consisting of a single blade, however deeply it may be cut or divided. All such leaves are termed **simple** (Fig. 29), in contradistinction with **compound** leaves (Fig. 30), which are made up of two or more, often many blades, supported by a common petiole. Yet this distinction of leaves into simple and compound is, to some extent, arbitrary, for in leaves which are parted—that is, divided to the base or mid-vein—the lobes become as essentially separate blades as if they were supported upon separate petioles: still, such leaves are commonly considered simple. Some writers simplify the matter by drawing the line at an articulation with the petiole, considering those only compound which are so articulated and all others simple. By articulation is meant the joint at which the leaf separates when it falls from the stem. But even this division is not completely satisfactory, for there are leaves—for example, the lemon—consisting of a single entire blade which is articulated with its petiole, and hence would under this definition have to be considered a compound leaf.

A compound leaf, then, is made up of two or more blades, termed *leaflets* (Fig. 30), borne upon a common petiole, with which they may or may not be articulated.

Compound leaves are of two principal forms, the **pinnate,** in which the leaflets are arranged like the pinnate veins of a simple feather-veined leaf, and the **palmate,** in which they are arranged palmately.

Pinnately compound leaves are **equally pinnate** when they have their leaflets in pairs; **unequally pinnate** (Fig. 30) when they have them in pairs surmounted by an odd terminal one.

But often the division of pinnately compound leaves is carried still farther, and the place of the leaflet is taken by another petiole bearing leaflets; the leaf is then termed **bi-pinnate** (Fig. 31); a step farther still, and it becomes **tri-pinnate.** In these cases the primary divisions are termed **pinnæ,** the secondary **pinnules,** though the blades are always called leaflets.

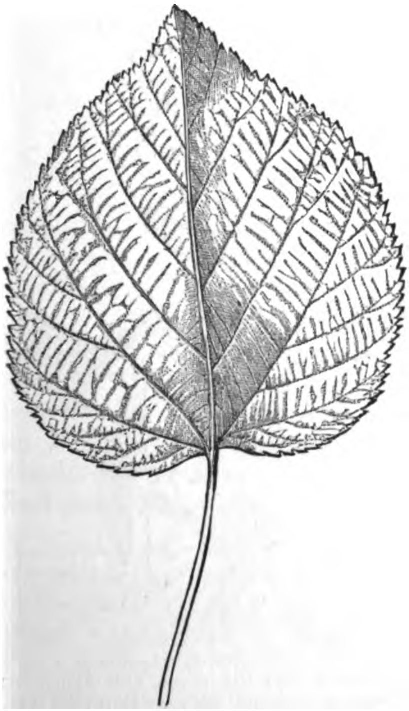

FIG. 29.—Simple leaf of bass-wood.

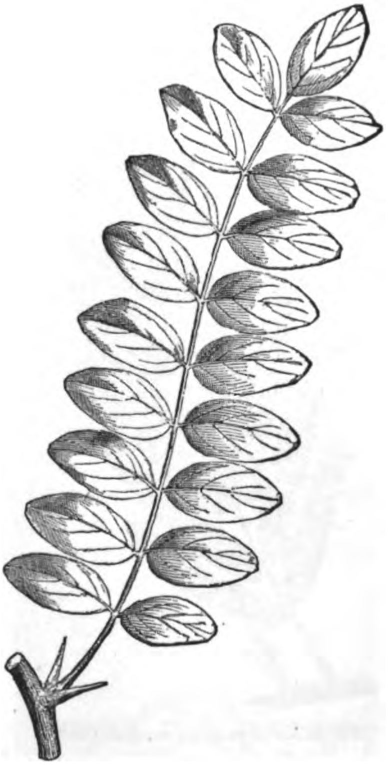

FIG. 30.—Compound leaf of locust (*Robinia Pseudacaia*). Unequally pinnate, the separate blades (*leaflets*) being in pairs, with an odd terminal one.

Palmately compound leaves are also frequently divided and subdivided in like manner, and may become **bi-** or **tri-palmate, ternate,** etc. When the subdivision is carried to an extreme point the leaf is termed **decompound.**

The same terms are used in the characterization of the general outline of compound leaves and their leaflets and the marginal features of the latter as are applied to simple leaves.

Besides simple and compound leaves, there are other abnormal forms, such as **tendrils, spines,** and **pitchers,** to which we can barely allude. Tendrils (Fig. 32) and spines are but reduced leaves, while pitchers are leaves which have undergone changes of structure to fit them for special purposes, as for example, the entrapping of insects.

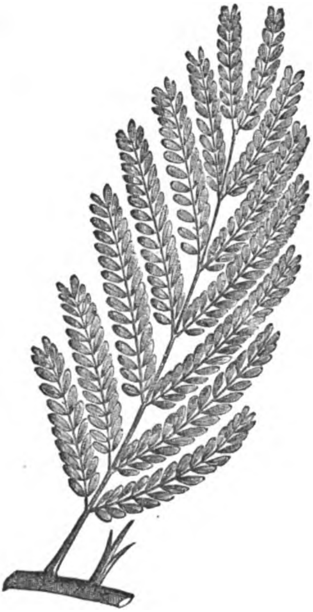

FIG. 31.—A bi-pinnately compound leaf.

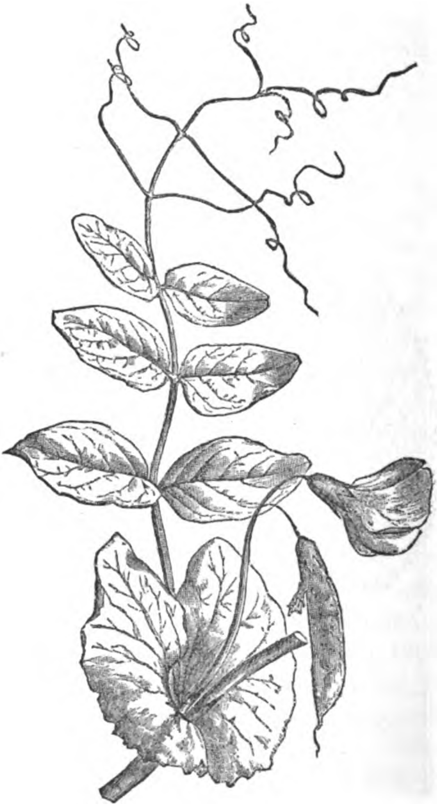

FIG. 32.—Compound leaf of pea, with the terminal leaflets changed to tendrils. The expanded leaflets at the base are foliaceous stipules.

As remarked above, a leaf may or may not have a distinct petiole. In the latter case the base of the blade is attached directly to the stem, with or without an articulation. In all **deciduous** plants—that is, those whose leaves fall away at the end of the growing season—the articulation is present whether there be a petiole or not. In endogenous plants the articulation is absent, the leaves, at the end of the growing season, dying away gradually.

In some cases where the petiole is absent, the base of the leaf encircles or clasps the stem. Occasionally the leaf appears as though perforated by the stem; it is then denominated **perfoliate.** In other cases a pair of leaves have their bases united about the stem; such leaves are termed **connate.**

The petiole is often furnished at its base with a pair of foliaceous or membranous appendages, termed **stipules.** Very often these serve as bud-scales and fall away after the leaf expands (Fig. 33); sometimes, however, they form a conspicuous part of the leaf and remain until it falls (Figs. 32 and 34).

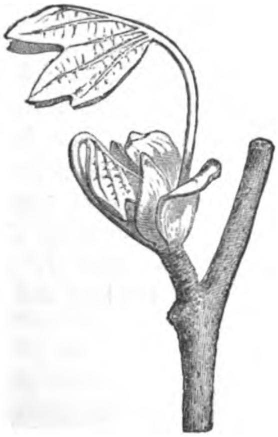

FIG. 33.—Leaf of tulip-tree with deciduous stipules.

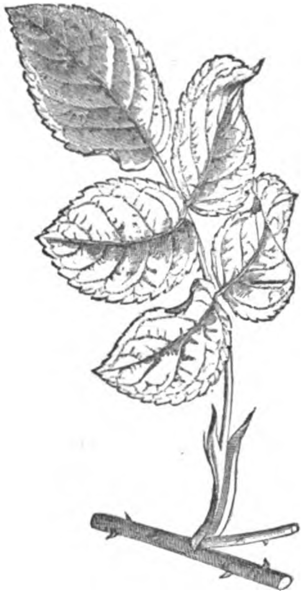

FIG. 34.—Leaf of rose with permanent foliaceous stipules.

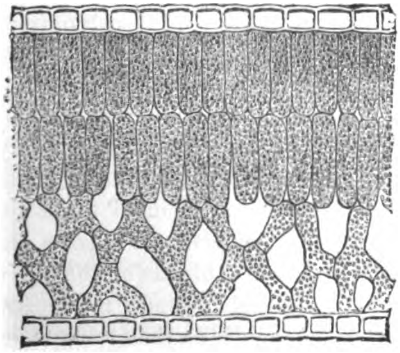

FIG. 35.—Vertical section of a leaf, showing cells of epidermis and parenchyma, and intercellular spaces. Magnified.

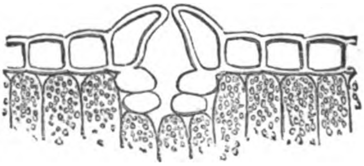

FIG. 36.—Vertical section through a breathing-pore of a leaf, showing the arrangement of the epidermal cells. Magnified.

We have already seen that leaves are composed of cellular and woody tissue, and have considered the latter in its ramifications which make up the leaf-skeleton. We will now briefly examine the cellular tissue.

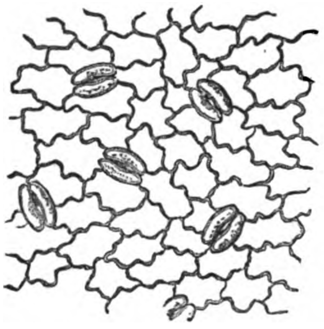

FIG. 37.—Surface of a leaf, showing stomata (breathing-pores). Magnified.

Unlike the cellular tissue of the stem, this is a green pulp closely resembling the green layer of the bark. It is made up of cells somewhat loosely arranged, with open spaces or air-passages between them (Fig. 35). These cells owe their green color to minute grains of a peculiar green coloring matter, termed **chlorophyll**, which they contain. Externally the entire leaf is covered with a thin, transparent membrane, termed **epidermis** (Fig. 36); this is perforated with numerous openings, termed **stomata** (Fig 37), which permit the external air to have free access to the intercellular air-passages. The stomata are much more numerous on the under than the upper side of the leaf, and here also the air-passages are most abundant.

FUNCTIONS OF THE LEAVES.

Leaves have often been compared with the lungs of animals, since it is their office to aërate the vital fluids of plants. The nourishment collected by the roots is transmitted through the stem to the leaves, and here, exposed to contact with the air, it becomes elaborated and fitted for the plant's further use. Through the multitude of stomata, or breathing-pores, the air has free access to the interior of the leaf, where the cells take from it carbonic acid and yield up their superfluous moisture, or absorb oxygen and water as may be required. In sunlight leaves absorb carbonic acid and give out oxygen; in darkness the process is reversed and carbonic acid is exhaled. But as plants are much more active in daylight than in darkness, the amount of carbonic acid taken from the atmosphere is many times greater than that which is exhaled; and as nearly all the carbonic acid absorbed is decomposed, the carbon alone being retained while the oxygen is returned to the air, it at once becomes evident that plants are continually purifying the air which animals breathe. Animals, on the other hand, are as constantly renewing the supply of carbonic acid in the air, and thus better fitting it for the sustenance of plants, so that there is an intimate interdependence of vegetable and animal life. Both probably had their advent upon earth at the same time, and progressed upward from the lowest to the highest forms, side by side, with equal steps.

So far the leaves are analogous to the lungs of animals, but their functions do not cease with the mere absorption of carbonic acid and the exhalation of oxygen. In their green cells—and in other green parts of plants—are carried on the functions of digestion and assimilation and the manufacture of the multitude of principles which give to plants their peculiar properties. Wherever these principles may be stored up, whether in the roots, the stem, the bark, the fruit, or in the leaves themselves, they are the product of the green cells, which attain their greatest development in the expanded leaves.

THE FLOWER.

Having studied the organs by which plants develop and exist as individuals, we have next to consider those engaged in the process of reproduction.

At an established period in every flowering plant's life, the terminal or axillary buds cease to produce leaves, their leaflets undergoing a transformation by which they become reproductive organs. A bud in this transformed condition is termed a **flower-bud,** and when fully expanded becomes a **flower.**

We have already seen that leaf-buds are not scattered hap-hazard along the stem, but are arranged in a fixed, determinate manner; now, as flower-buds are but transformed leaf-buds, we are prepared to find them also occupying fixed positions. This arrangement of flowers is termed **inflorescence,** and demands a brief examination before proceeding to the consideration of the structure of the flower.

In some plants only the buds terminating the main stem and branches are transformed into flowers; in others, only the axillary; in others still, but much more rarely, the flowers are both axillary and terminal.

When the flowers are all terminal the inflorescence is termed **determinate;** when they are all axillary it is termed **indeterminate,** because so long as the terminal bud continues to produce leaves with buds in their axils, flowers follow as a matter of course, and their number is indefinite.

The organs of inflorescence are **bracts, peduncle, pedicel,** and **receptacle.**

Bracts are altered leaves from the axils of which the floral axes spring; they may be foliaceous, membranous, scarious, or petaloid (colored). Secondary bracts—that is, those at the base of secondary divisions of a floral axis—are termed **bractlets.**

A **peduncle** is a branch directly terminated by a flower; and its extremity, usually more or less enlarged, upon which the floral organs proper are seated, is the **receptacle.**

A **pedicel** is a secondary peduncle, or in other words, the stalk upon which an individual flower of a branching inflorescence is situated.

Indeterminate inflorescence presents five well-marked forms, termed the **raceme, corymb, umbel, spike,** and **head,** each of which is subject to various modifications.

A **raceme** is an inflorescence in which nearly equal secondary axes rise along the primary one; it is **simple** when the secondary axes terminate in a single flower (Fig. 38); **compound** when they branch before flowering. A compound raceme is termed a **panicle.** A panicle of an ovoid shape, having the central pedicels longer than the outer, is called a **thyrse.**

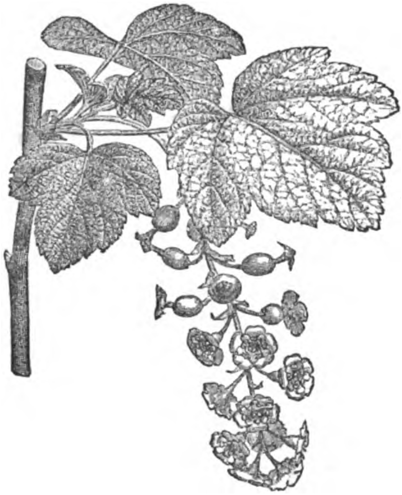
FIG. 38.—Simple raceme of the red currant.

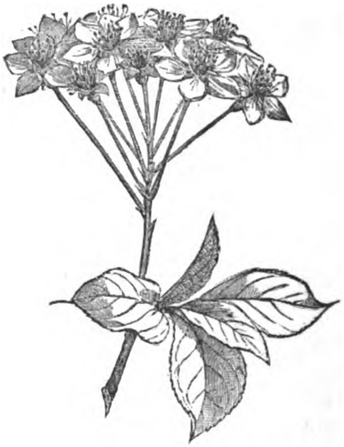
FIG. 39.—Corymb of a cherry.

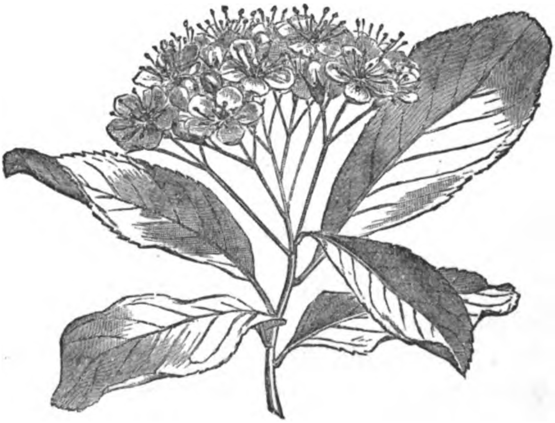
FIG. 40.—A compound corymb.

A **corymb** resembles a raceme, but has its lower pedicels longer than the upper ones, thus bringing the flowers upon a level with each other. It may be simple (Fig. 39) or compound (Fig. 40).

An **umbel** has its secondary axes diverging from the same point, like

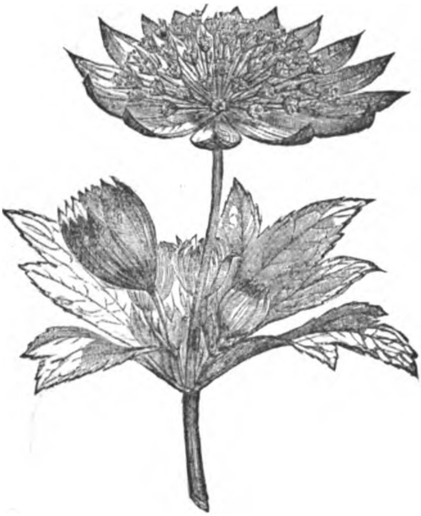

FIG. 41.—A simple umbel.

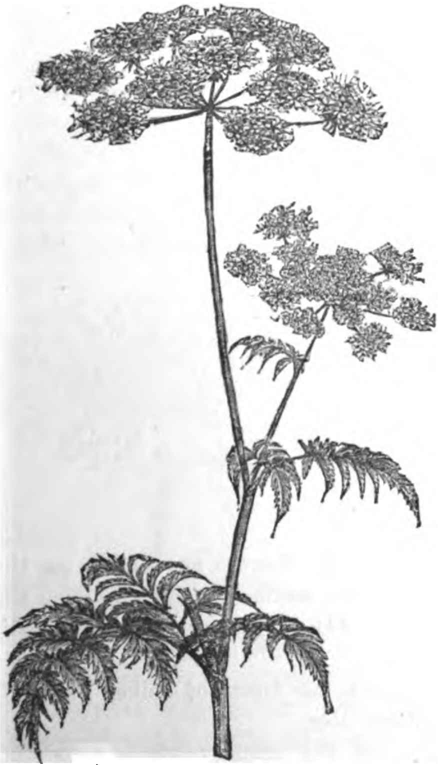

FIG. 42.—A compound umbel.

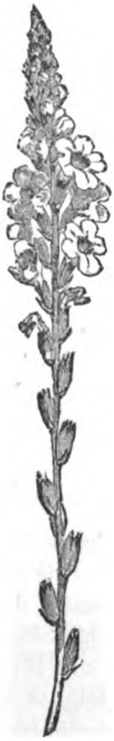

FIG. 43.—A simple spike.

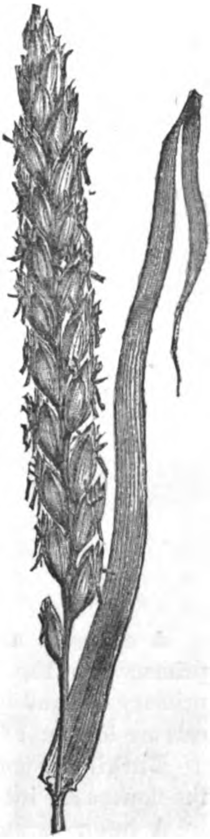

FIG. 44.—A compound spike.

the ribs of an umbrella. It is **simple** when the secondary axes bear flowers (Fig. 41); **compound** when they divide before flowering (Fig. 42). In the latter case the ultimate clusters of flowers are termed **umbellets,** or **partial umbels.**

In compound umbels the bracts at the base constitute the **involucre,** and those at the base of the umbellets the **involucel,** or **partial involucre.**

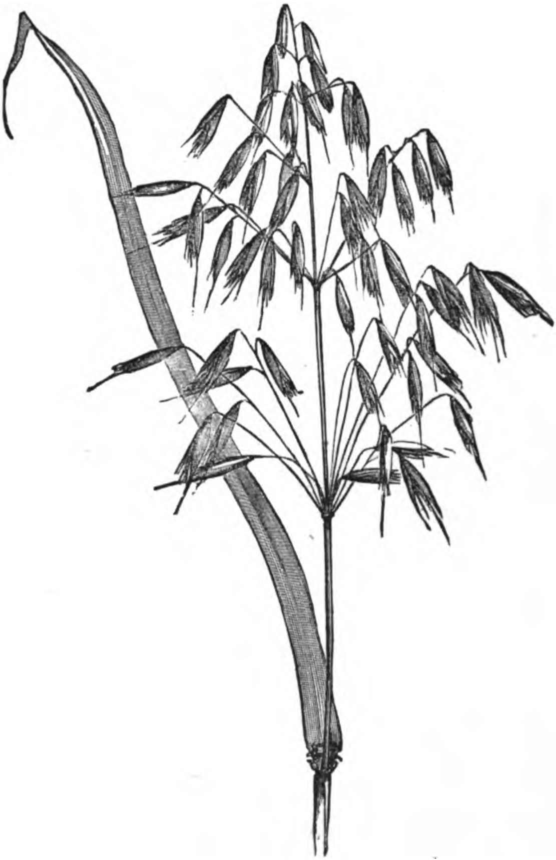

FIG. 45.—A panicle.

A **spike** is an inflorescence in which the flowers are sessile on the primary axis (Fig. 43). It is compound when secondary axes rise from the primary one and bear sessile flowers (Fig. 44). In many cases these pedicels are long and form panicles (Fig. 45).

Catkins (Figs. 46 and 47) and **cones** are forms of spikes in which the flowers are incomplete, as will appear later.

A **head** is an inflorescence in which the primary axis is depressed vertically, being at the same time broadened, and having the flowers more or less thickly crowded together upon a common receptacle, which, in fact, the depressed primary axis becomes. Here the outer bracts, commonly numerous, constitute the involucre, and the inner ones—that is, those about the individual flowers—are reduced to chaffy scales or bristles.

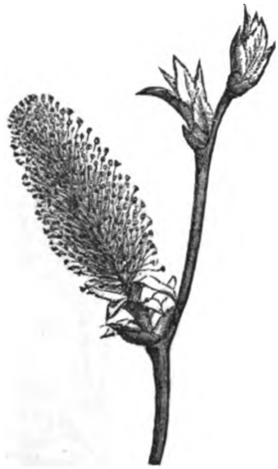

FIG. 46.—Staminate catkin of willow.

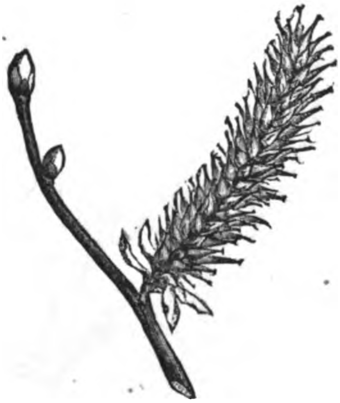

FIG. 47.—Pistillate catkin of willow.

In all these forms of inflorescence the lower or outer flowers expand first, and the upper or inner last. There is, therefore, a movement from the circumference toward the centre, and hence the inflorescence is termed **centripetal.**

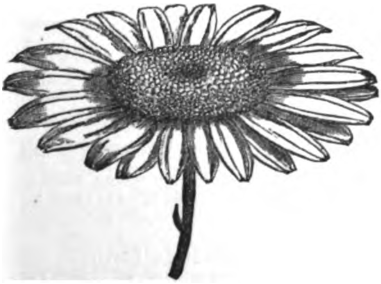

FIG. 48.—A head (compound flower).

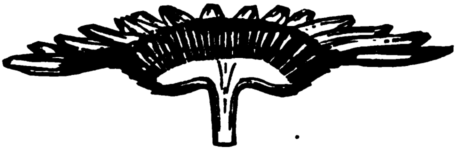

FIG. 49.—Vertical section of same.

Determinate inflorescence is much simpler and presents fewer different forms. It comprises the **cyme, fascicle,** and **glomerule.**

A **cyme** is commonly a flat-topped flower-cluster, like a corymb, only it is produced in a different manner (Fig. 50). It presents several different forms.

The primary axis may terminate in a single flower, from whose axils two secondary axes proceed, each terminating in a flower, with other tertiary axes, and so on. This is a **dichotomous** (forked) cyme.

Again, the primary axis terminating in a flower, subtended by a single bract, from its axil proceeds a secondary axis terminating in like manner; from its axil a tertiary, and so on. In this manner is produced the **scorpoid cyme** or **raceme,** which seems to unroll as flowering proceeds (Fig. 51).

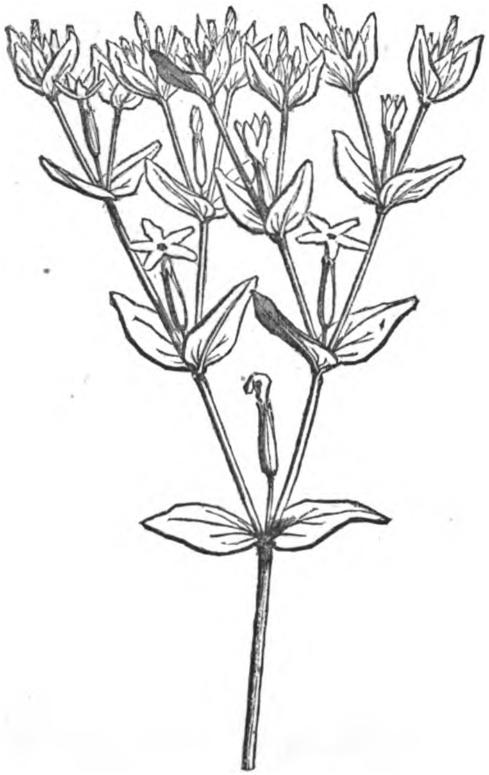

Fig. 50.—A cyme.

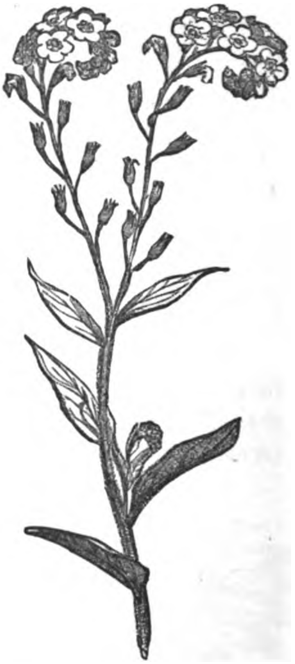

Fig. 51.—A scorpoid cyme or raceme.

In other cases still the cyme assumes a spicate or umbellate form.

Both the **fascicle** and **glomerule** are of a cymose character. In the former the axes are somewhat lengthened and are regularly distributed; in the latter they are almost suppressed and very irregular.

In determinate inflorescence the central flower always expands first, and the outer or lower flowers follow in regular succession, so that there is a movement from the centre toward the circumference; hence this form of inflorescence is termed **centrifugal.**

Mixed inflorescence is that in which both the determinate and indeterminate appear. In labiate plants the general inflorescence is indeterminate, while the separate heads are axillary cymes or fascicles.

There are other altogether irregular forms of inflorescence, which, however, do not require our attention.

The **floral organs** comprise those which are essential to reproduction, namely, **stamens** and **pistils,** and those which envelop the essential organs, namely, **calyx** and **corolla.** All these organs are enfolded in the bud, each kind in a separate whorl or circle by itself.

The **calyx** is the external envelope of the flower. It is commonly green, like the leaves, though occasionally colored (*petaloid*), and is composed of from two to six or more leaflets, termed **sepals,** each separate and distinct or all more or less united.

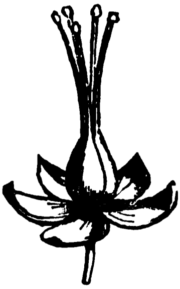

FIG. 52.—A polysepalous calyx.

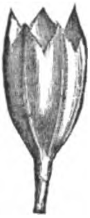

FIG. 53.—A mono- or gamosepalous calyx.

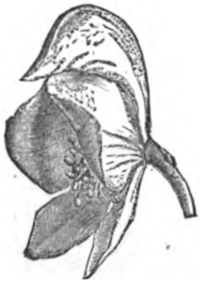

FIG. 54.—Irregular (petaloid) calyx of aconite.

When the sepals are distinct the calyx is termed **polysepalous** (Fig. 52); when they are united it is termed **mono-** or **gamosepalous** (Fig. 53). The monosepalous calyx is commonly more or less cut or divided from the margin downward; in such cases the undivided portion is termed the **tube,** the free border the **limb,** and the point where these meet the **throat.** The separate portions of the limb are often spoken of as **lobes,** or **teeth.** It should be borne in mind, however, that in the early stage of the development of the calyx the sepals are always distinct; hence a gamosepalous calyx is one in which the sepals have grown together, in whole or in part, its teeth or lobes alone remaining to show the number of the original sepals.

The calyx is **regular** when its sepals are all alike (Figs. 52 and 53); **irregular** when some of them are different in form from the others (Fig. 54). It is **deciduous** when it falls away after the fertilization of the flower; **caducous** when it falls as the flower expands; **persistent** when it remains until the fruit matures.

The **corolla** is the inner floral envelope. It is commonly colored, and in this respect is in strong contrast with the calyx. Its separate leaflets are termed **petals,** and, like the sepals, they may be more or less numerous, and each separate and distinct, or all may be wholly or partly united.

When the petals are distinct the corolla is termed **polypetalous** (Fig. 55); when they are united it is termed **mono-** or **gamopetalous** (Fig. 56). In the gamopetalous corolla there is the same distinction of tube, throat, limb, and lobes as in the gamosepalous calyx, and it is developed in the same manner—by the fusion of originally distinct leaflets. It may likewise be regular (Figs. 55 and 56) or irregular (Figs. 57 and 58), and though commonly deciduous, it is sometimes **withering-persistent** —that is, withering but not falling away from the maturing fruit. In short, the corolla is very like the calyx, save that it is much more delicate in structure, more beautiful in form, and often most exquisitely colored.

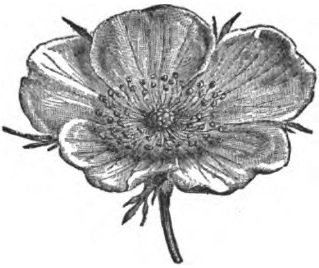

FIG. 55.—Polypetalous corolla of a wild rose.

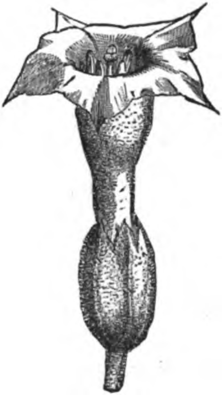

FIG. 56.—Monopetalous corolla and monosepalous calyx of tobacco.

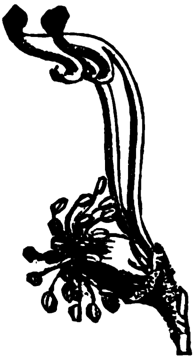

FIG. 57.—Irregular corolla of aconite.

It is not unfrequently absent; then the flower is called **apetalous.** In this case the calyx is often colored like a corolla, and therefore well supplies its place. But in many plants both calyx and corolla are wanting; then the flowers are termed **naked.**

The essential floral organs, as remarked above, are the stamens and pistils. The stamens are variable in number, and commonly form a circle within the corolla if this be present, or in its absence within the calyx. They are the fertilizing organs, or, according to the former ideas of the sexuality of plants, they supply the male element in the process of reproduction.

A **stamen** consists of two parts, an **anther** and a stalk or **filament** upon which this is supported (Fig. 59). The anther is the only essential part, and this may be and often is sessile. It consists of two cells, divided from each other vertically by a septum, each opening at maturity and yielding a cellular, powdery substance—the **pollen,** which is the fertilizing element. Anthers are extremely varied in form in different plants, and are attached to their filaments in a variety of ways.

An anther is **innate** when attached by its base to the apex of the filament; **adnate** when attached by one face to the side of the filament; **versatile** when attached at its middle point so as to turn easily; when it is fixed to the side of the filament which looks toward the pistil it is **introrse**; and when fixed to the other side it is **extrorse.**

As intimated above, the filament is of minor importance. It is varied in size and length, and is not unfrequently absent altogether.

The stamens may also be each separate and distinct, or they may be more or less united. They are **monadelphous** when united by their filaments into one set; **diadelphous** in two sets; **polyadelphous** in several sets; and **syngenesious** when united into one set by their anthers, as in the *Compositæ* (Figs. 60 and 61).[1]

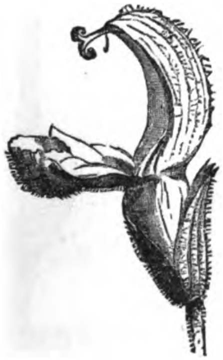

FIG. 58.—Irregular flower of sage. Enlarged.

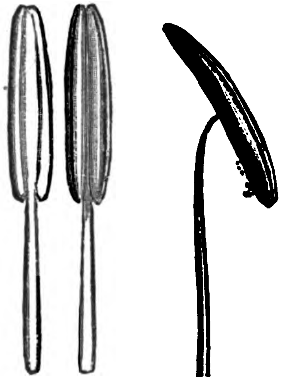

FIG. 59.—Common forms of stamens and anthers.

The **pistils** are the organs which are fertilized and bear the seeds. Their position is in the centre of the flower; like the other floral organs, their number is variable—there may be one or many.

A pistil may commonly be distinguished into three parts, namely, the **ovary,** the **style,** and the **stigma** (Fig. 62). Of these the first and last are always present, but the style may be absent, in which case the stigma is sessile upon the ovary.

The **ovary,** as its name indicates, is the organ which contains the **ovules** or rudimentary seeds; the stigma is the part upon which the pollen is deposited; and the style the intervening portion.

The pistil exhibits an almost endless variety of forms; hence it is difficult to characterize it in such general terms as we are obliged to employ in this place.

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[1] For further details regarding compound flowers, see *Compositæ*.

Bearing in mind, however, that all the floral organs are but transformed leaflets of leaf-buds, it is not difficult to understand the structure of the pistil. Let us take, for example, a pea-pod, which is only a simple pistil that has been fertilized and undergone subsequent development, without any essential change of form. Split it open on the side to which the seeds are attached and spread it out as nearly flat as possible. We observe, then, that it has the general form of a leaf with a stalk like a petiole, and a mid-vein which continues to the apex, while on the margins are placed the seeds. Now this pod is but an altered leaflet, which was folded inward and united at the margins, and had developed along this line of union a number of ovules. At the apex the stigma was placed, and through this fertilization was effected, as will be seen later. Such is the general plan upon which the simple pistil is constructed; but as the leaves of plants exhibit an endless variety of forms, so naturally would the leaflets whose transformations produce pistils, and hence the pistils also. Again, the pistils are very often compound—that is, made up of from two to many simple ones grown together. Suppose, for example, a circle of five leaflets stand in the centre of a bud, which are to be transformed into a compound pistil. The margins of each would be folded in and united, to form simple pistils; then the sides of each, coalescing with those of its

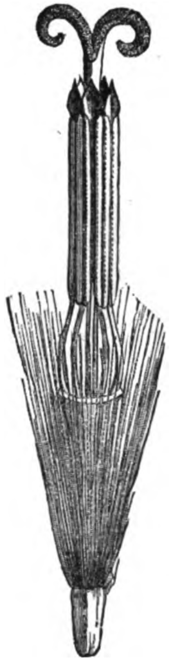


Fig. 60.—A disk or tubular floret of a head (compound flower), showing the anthers united into one set (syngenesious). Magnified.

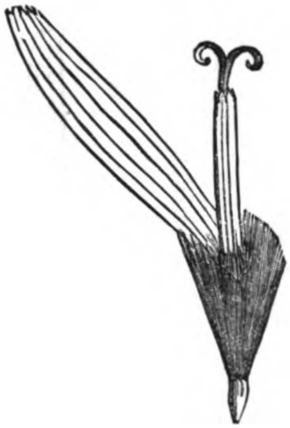


Fig. 61.—A ray floret of a head (compound flower).

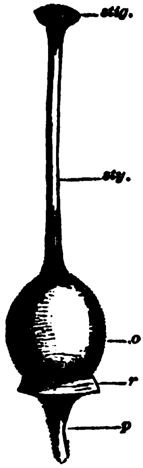


Fig. 62.—A pistil. *o* is the ovary, *sty.* the style, *stig.* the stigma. The ovary rests upon the receptacle (*r*), which terminates the peduncle (*p*).

neighbors, would result in a compound five-celled ovary. Suppose them united to each other from base to apex, and one common stigma might do for all; let union take place only half way up, and there would be a compound ovary, but with five styles and five stigmas. The pistils of fetid hellebore (Fig. 63) are united at the base only, and are considered simple by some, compound by others.

Of the pollen and ovules little need be said here, save that they have a strict analogy with the fertilizing element and the ovule of animal reproduction. Both exhibit a great variety of forms.

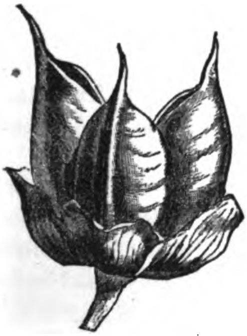


FIG. 63.—Pistils of fetid hellebore united at the base.

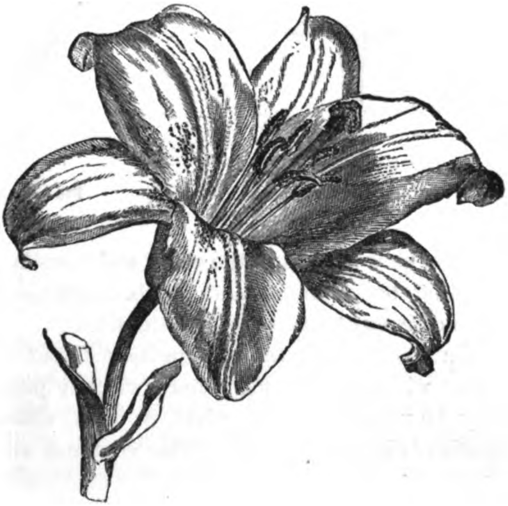


FIG. 64.—A lily. Parts of the flower in threes (3-merous).

Having thus briefly considered the organs which compose the flower, we will now examine their numerical disposition and their arrangement upon the receptacle.

In exogenous plants the parts of the flowers are commonly in *fives* or *fours*, or in multiples of those numbers; and however much they may differ in this respect, they are never completely in threes. In endogenous plants, on the contrary, the habitual arrangement is in *threes*. This should be borne in mind, since it is another prominent and characteristic mark of difference between these two great divisions of flowering plants.

In speaking of a flower in respect to the numerical arrangement of its parts, it is said to be **3-merous, 4-merous,** or **5-merous** (Figs. 64, 65, and 66).

But here, as elsewhere in plant life, there is endless diversity. A strictly 5-merous flower should have five sepals, five petals, five stamens, and five pistils, or multiples of this number. Now, in reality such a flower is rare. It would be much easier to find one with five sepals, five petals, ten stamens, and one 5-celled ovary; or a 4-merous flower with two sepals, four petals, sixteen to twenty-four stamens, and a 1-celled ovary. In fact, in exogenous plants the numerical arrangement, though commonly in fives or fours, presents almost innumerable exceptions—some, indeed, in which the exact plan is scarcely discernible; but, be it remembered, it is never completely in threes. In endogenous plants, however, the arrangement by threes is much more uniform and the exceptions much more rare.

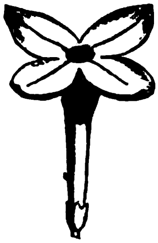


FIG. 65.—A flower of the common lilac—4-merous.

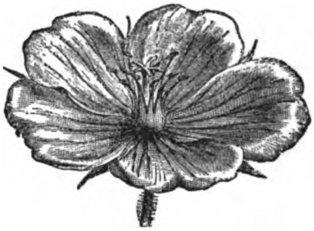


FIG. 66.—Five-merous flower of a geranium.

We have seen that the calyx and corolla may be regular or irregular, and that both stamens and pistils are subject to variations also. Another form of irregularity requires attention.

In many plants there is an imperfection in the flowers, some of them being without stamens, others without pistils. These imperfect flowers may be upon the same plant, or upon different individuals of the same species (Figs. 46 and 47). The common ailanthus, so largely used as a shade-tree, has flowers with stamens only (*staminate*) on one individual, and those with pistils only (*pistillate*) on another. Such plants are termed **dicecious**; while those with both kinds upon the same individual are termed **monoecious.** Still others have not only perfect flowers—that is, those with both stamens and pistils—but these imperfect staminate and pistillate flowers also; such plants are termed **polygamous.**

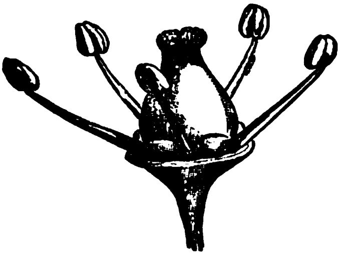


FIG. 67.—Pistil of the vine with hypogynous stamens. The corolla and calyx (also hypogynous) removed. Enlarged.

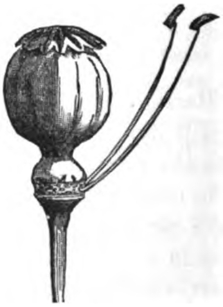


FIG. 68.—Superior ovary of the poppy.

To sum up the irregularities of flowers as they actually exist, let almost any one be compared with a typical flower, which is **perfect,** having both kinds of essential organs; **complete,** having all the sorts of organs which any flower possesses, namely, calyx, corolla, stamens, and pistils; **regular,** all parts of each set being alike; **symmetrical,** with the same number of parts in each set.

The arrangement of the floral organs upon the receptacle next demands attention.

The calyx is commonly attached to the lower border of the receptacle; the corolla next above, its petals alternate with or opposite the sepals; above the corolla are the stamens, and above these the pistils. In such an orderly arrangement as this the organs beneath the pistils are said to be **hypogynous,** and the pistil, in relation to them, is said to be **superior** (Figs. 67 and 68). All the organs in this case are **inserted** on the receptacle.

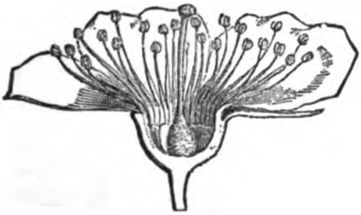


FIG. 69.—Perigynous stamens and petals of the peach.

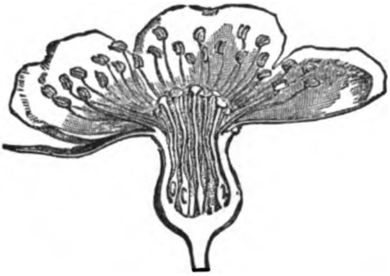


FIG. 70.—Perigynous stamens and petals of the wild rose.

In other cases the calyx and pistil only have direct relation with the receptacle, the corolla and stamens being inserted on the former; they are then said to be **perigynous** (Figs. 69 and 70). Again, the calyx may be coherent with the pistil in whole or in part; in these cases the calyx is said to be **superior** or **half-superior** (Figs. 71 and 72), while the corolla and stamens are, as before, perigynous. In case the tube of the calyx ends at the summit of the ovary, its lobes as well as the petals and stamens appearing as if inserted on the ovary, they are termed **epigynous.**

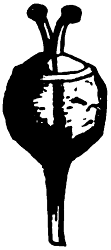


FIG. 71.—Calyx—superior.

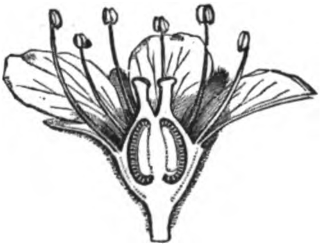


FIG. 72.—Calyx—half-superior.

FUNCTIONS OF THE FLOWER.

The only function of the flower which requires our attention is the reproduction of the species.

The manner in which this is accomplished is sufficiently simple, and, to one acquainted with the phenomena of reproduction in animals, readily understood.

As the flower expands the anthers expel their pollen through pores or valves opened for this purpose (Figs. 73 and 74). The pollen is either shed directly on the stigma or is carried there by the wind or by insects, and once there it is retained by a glutinous secretion of the stigma (Fig. 75).

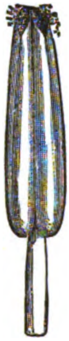


Fig. 73.—An anther opening by pores or chinks at the top.

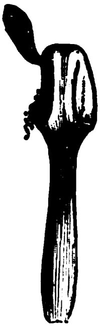


Fig. 74.—An anther opening by valves.

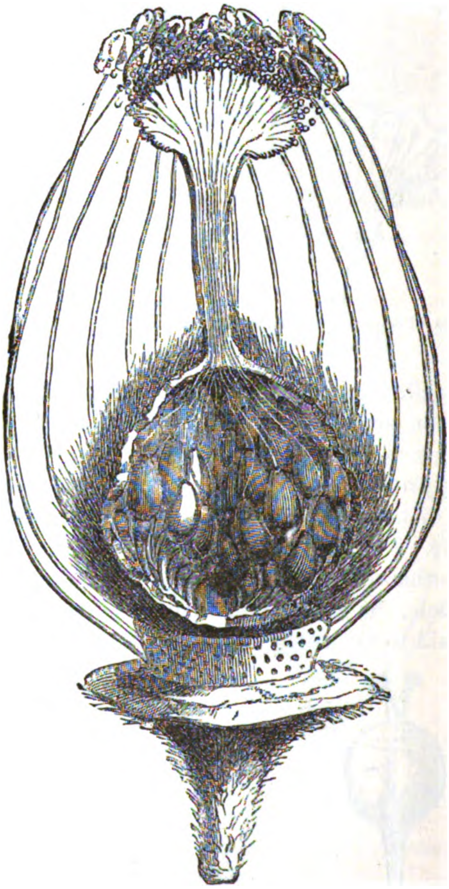


Fig. 75.—Anthers depositing pollen directly on the stigma, through which the pollen-tubes are seen passing to the ovules.

From each pollen-cell (Fig. 76) is then protruded a minute tube, the *pollen-tube*, which insinuates itself through the stigma, and continuing its growth until it reaches an ovule, penetrates this at a minute pore prepared for its reception, and there deposits its contents (Figs. 77 and 78); fertilization is then an accomplished fact, and the pollen and pollen-tube wither away while the ovary and ovule continue their growth until the fruit is matured.

Even the most careless observer of plants must have noticed that in many of our common species the fruit often contains abortive or imperfect seeds. Pea-pods, for example, are often seen with only a single perfect seed; and ears of Indian corn with half the kernels imperfect are exceedingly common. In these instances and in all others of like character the ovules, represented by the imperfect seeds, have failed to be reached by the fertilizing pollen-tube. Not unfrequently, also, diœcious plants, of the pistillate kind, and hence naturally fertile, bear flowers year after year without producing fruit, much to the bewilderment of their owners. The cause is not far to seek. Such plants are remote from individuals producing staminate flowers, and must of necessity remain barren until this fault be remedied.

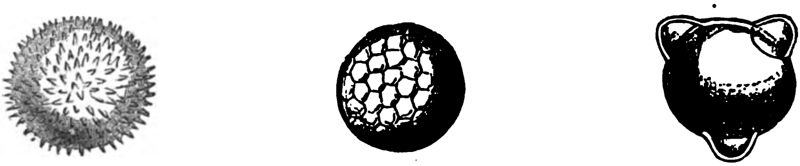


FIG. 76.—Different forms of pollen. Magnified.

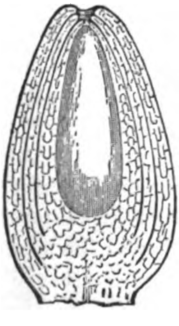


FIG. 77.—Vertical section of an ovule before fertilization. Magnified.

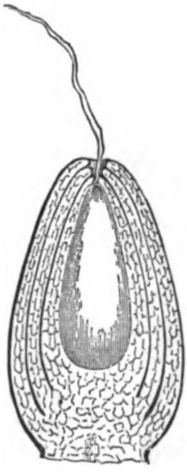


FIG. 78.—Vertical section of an ovule after fertilization, with pollen-tube *in situ*. Magnified.

Another point of interest in this connection is the production of **hybrids,** by the crossing of related species or varieties.

Every farmer knows that if two varieties of corn, say yellow and white, be planted side by side, the result will be a great many ears of speckled corn, those with both white and yellow kernels intermingled. Now, corn is a monœcious plant, the pollen being produced in vast quantities by the tassels (stamens), while the silk of the ears represent the exposed portions of the pistils. Naturally two varieties growing side by side will have their showers of pollen intermingled by the wind, and grains of each falling upon the silk of the same ear will produce a mixture of different colored kernels, for the pollen will determine the character of the kernel produced by the ovule which it fertilizes.

Again, the pumpkin and squash are closely related species, and cannot be grown side by side without hybridization. But, as in the animal kingdom, the production of hybrids is limited to closely related species or varieties, and cannot be effected by the crossing of individuals of widely different genera. Strictly speaking, the hybrid is the product of the crossing of related species, but in a wider sense it may, without impropriety, be applied in plant life to the crossing of varieties, as in the instance of corn.

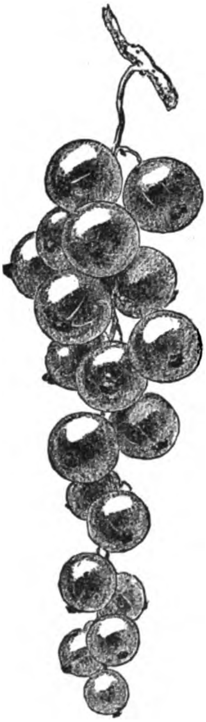


FIG. 79.—Currants—berries.

THE FRUIT.

The fruit is the fertilized and matured ovary enclosing the seeds, capable of reproducing the plant. Not unfrequently, also, it comprises the remaining parts of the pistil, more or less altered, or the enlarged and variously modified calyx and receptacle.

Fruits are distinguished as *simple* or *compound.* A **simple fruit** consists of a single matured pistil, whether this be simple or compound, together with its enclosed seed or seeds, the seed-vessel, termed **pericarp,** being the matured ovary, and the seed the fertilized and matured ovule.

The **pericarp** is distinguished into three layers, namely, **epicarp** (outer layer), **endocarp** (inner layer), and **mesocarp** (middle layer). In many fruits the mesocarp is very thick and fleshy, and is then known as the **sarcocarp.**

There are three principal kinds of simple fruits, **fleshy fruits, stone-fruits,** and **dry fruits.**

In fleshy fruits the whole pericarp thickens and becomes soft in ripening. Of this kind are the **berry, pepo,** and **pome.**

In the **berry** the flesh is uniformly soft throughout, as in the currant (Fig. 79), huckleberry, tomato, and grape. The strawberry, blackberry, and raspberry are not, botanically, berries, as will appear later.

The **pepo** is the kind of fruit found in the gourd family; it is commonly hard without and softer within.

The **pome** finds its type in the apple, in which the mass of tissue is composed of the thickened, adherent calyx, the thin pods containing the seeds being the only representatives of the pistil.

The stone-fruit is technically known as a **drupe.** It comprises an outer fleshy portion enclosing a stone or **putamen,** containing the seed (Figs. 80 and 81).

Dry fruits are those in which the pericarp retains an herbaceous texture during its development, and results in a membranous or hardened coating to the seed. In some of these the pericarp opens at maturity and permits the seeds to escape; such fruits are termed **dehiscent.** In others, as well as in all fleshy and stone-fruits, the pericarp remains closed; these are termed **indehiscent.**

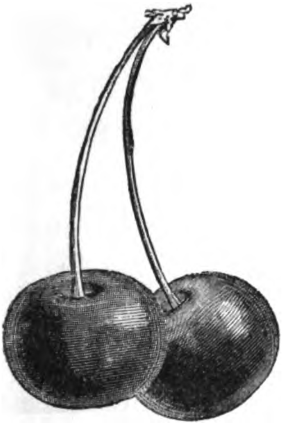


FIG. 80.—Cherries. Example of a drupe.

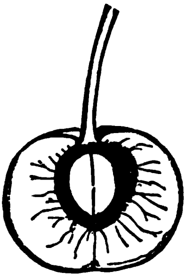


FIG. 81.—Vertical section of a cherry.

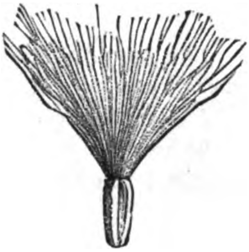


FIG. 82.—Achenium of a composite plant.

Of **indehiscent dry fruits** a common form is the **achenium,** or **akene,** a 1-seeded fruit, appearing like a seed, but being covered closely by the pericarp. Of this kind are all the fruits of the *compositæ* (Fig. 82) and many of the *ranunculaceæ.* The real botanical fruit of the strawberry is also an achenium, for each of the so-called seeds is an achenium immersed in the fleshy, edible receptacle (Fig. 83). In the raspberry and blackberry each grain is a minute berry or stone-fruit surrounded by a fleshy mass, in the one case separable from the receptacle, in the other fused with it (Figs. 84 and 85).

The achenia of the compositæ are commonly crowned with a tuft of bristles or hairs, termed the *pappus* (Fig. 82), designed to favor their distribution by the wind. That of the dandelion will serve as an illustration.

The **utricle** is an achenium with a loose, bladdery pericarp.

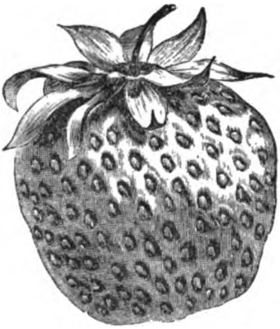


Fig. 83.—A strawberry, showing the seeds (achenia) immersed in the fleshy receptacle.

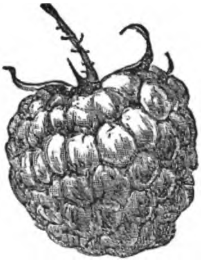


Fig. 84—A raspberry.

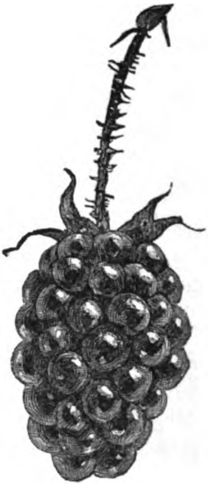


Fig. 85.—A blackberry.

The **caryopsis** has the pericarp incorporated with the seed, as in wheat, rye, and Indian corn.

A **nut** is a dry indehiscent fruit with a hard woody or bony shell, as in the acorn, chestnut, and cocoanut. The acorn rests in a cup-shaped involucre, termed the **cup,** or **cupule;** the chestnut in a prickly bur.

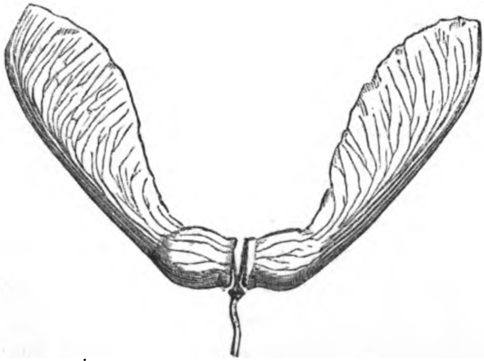


Fig. 86.—Samara of the maple.

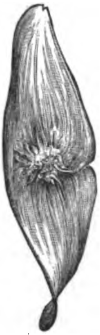


Fig. 87.—Samara of the ailanthus.

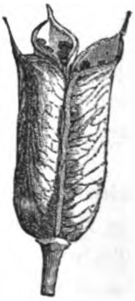


Fig. 88.—Follicle of aconite.

A **samara,** or key-fruit, is either a nut or an achenium, or any other dry fruit furnished with a wing to favor its distribution by the wind. Of this kind are the fruits of the maple (Fig. 86), elm, tulip tree, and ailanthus (Fig. 87).

Capsule, or **pod,** is the general name for dry seed-vessels which split open at maturity in some regular manner. It presents many different forms.

The **follicle** is the fruit of a simple pistil which splits along its inner suture—that is, the suture formed by the united edges of the leaflet which formed the pistil (Fig. 88).

The **legume** splits along both sutures, as we see in the bean and pea (Fig. 89). It is common to a large order of plants, the *leguminosæ*.

The true capsule is the product of a compound pistil. It may be one or many-celled, and may discharge its seeds through chinks or pores, as in the poppy (Fig. 90), or burst irregularly, or, as is most common, open by valves.

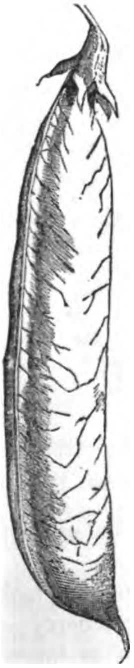


FIG. 89.—Legume of the pea.

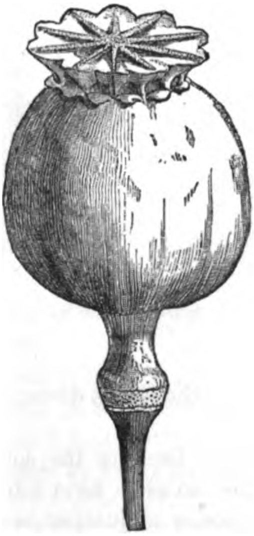


FIG. 90.—Capsule of poppy.

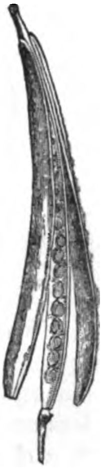


FIG. 91.—A silique.

Dehiscence by valves is **loculicidal** when the pod splits down the back of each cell; **septicidal** when the cells first separate from each other through their partitions and then open along their inner margin.

The **silique** is the pod found in the *cruciferæ*. It is divided into two cells by a false partition, and generally opens by two valves from below upward (Fig. 91).

The **silicle** is a short, broad silique, like that of the shepherd's purse.

The **pyxis** is a pod which opens transversely, the upper portion forming a lid or cover (Fig. 92).

Compound fruits are those resulting from many blossoms aggregated into one mass. The most common form is the **strobile,** or **cone,** the fruit of the *coniferæ.*

The **cone** is composed of open pistils, commonly in the form of flat scales, regularly overlying each other, and all pressed together into a conical shape (Fig. 93). Each scale bears one or two seeds on its inner surface. When mature and dry the scales diverge and permit the seeds to escape.

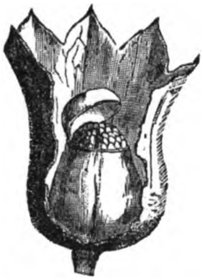


FIG. 92.—Pyxis of henbane.

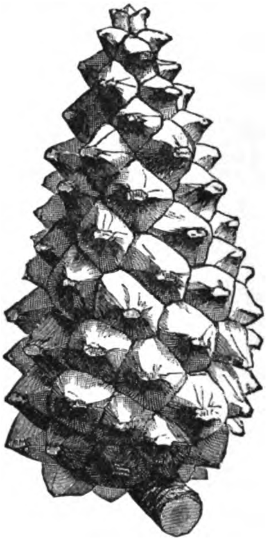


FIG. 93.—A pine cone.

In some plants the scales forming the cone become fleshy and more or less united to each other, so as to form a fruit resembling a berry; of such a character are the cones of juniper, commonly known as juniper berries.

THE SEED.

Ovules which have been fertilized and undergone subsequent development become seeds.

The seed consists of a kernel covered by an integument. The integument or seed-coat is divisible into two layers, an external often hard and crustaceous, termed the **testa,** and an internal one, which is thin and delicate.

The **testa** sometimes fits the kernel closely, as in the bean; again, it is expanded into a wing (Fig. 94) or is tufted with long, soft hairs, as in the milk-weed, or with more delicate fibres, as in cotton (Fig. 95). Some seeds have an additional covering, more or less expanded in form, termed an **arillus,** or **aril;** of such character is the mace of nutmeg and the scarlet pulp enclosing the seeds of the woody bitter-sweet (*Celastrus scandens*), so much used for winter decoration.

All the expansions of the external seed-coat are evidently designed to favor the distribution of the seeds.

The scar left where the seed-stalk separates is termed the **hilum;** the minute orifice through which the pollen-tube entered, now closed up, is termed the **micropyle.**

The **kernel** is the essential part of the seed. In many seeds it is all **embryo**—that is, a minute folded-up plantlet; in others it comprises not only the embryo, but a mass of nourishing matter in which this is imbedded, termed the **albumen.**

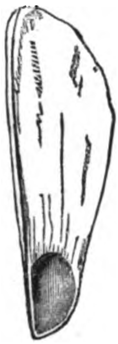


Fig. 94.—Winged seed of the pine.

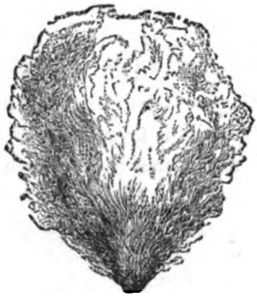


Fig. 95.—Cotton seed.

The **albumen** is composed of starch, gluten, oily matters, etc., and is designed to nourish the young plantlet during the early stages of its development, before its roots have taken firm hold of the soil. It should be borne in mind that this differs in every essential particular from animal albumen.

The **embryo,** or **germ,** is the embryo plantlet whose development we have studied in the bean and Indian corn. It is distinguishable into three parts, namely, (1) the **radicle,** called also and more properly the **caulicle,** or rudimentary stem, to one end of which are attached (2) the **cotyledons,** or seed-leaves, between which is the rudimentary bud termed the (3) **plumule,** while the other end becomes the descending axis.

And here we leave this branch of our subject, having outlined, in a general way, the history of flowering plants from their germination in the seed to their reproduction in seed again.

From this history that of **flowerless** or **cryptogamous plants** differs in many essential particulars, but most of all in their earliest and latest stages, in germination, and in reproduction. This subject cannot be entered into in detail here, for however active cryptogamous plants may be in the causation of disease—and surely this is a vexed question just now—they are not, as a rule, particularly efficacious in its cure, at least so far as our present knowledge goes.

Of the lowest orders we shall say nothing save that their life history is similar to that of the lowest orders of the animal kingdom, being, in fact, nothing but the history of single cells.

The highest orders, termed **acrogenous cryptogams,** have a distinct axis, growing from its apex only, containing woody tissue and vessels, and usually with some foliage. They are destitute of true flowers, but produce, instead of seeds, minute bodies termed **spores.** From these spores are produced new plants, but in a manner altogether different from the germination of the seed of a flowering plant. In the first place, from the spores are developed organs analogous to stamens and pistils; the latter being fertilized by the former, a new plantlet is the result. In other words, reproduction is not finally accomplished by the parent plant, though the materials for its accomplishment are fully prepared.

To this class belong very few medicinal species, male fern (*Aspidium Filix-mas*), shield fern (*Aspidium marginale*), and club-moss (*Lycopodium*) being the only ones indigenous to North America.

CLASSIFICATION OF PLANTS.

The unit of classification in vegetable as in animal life is the **species**; and a knowledge of all known species would, in one sense, comprise the knowledge of the whole vegetable kingdom. But as species indicates a relationship of individuals, so different species bear relationship to each other, and groups of species relationships to other groups, and so on until the entire vegetable kingdom is included.

An illustration will best serve to define a species. Take, for example, *peppermint*. We have here a plant of a certain aspect, with stem, leaves, flowers, and fruit to a certain extent peculiar to itself. The seed of one individual or of a thousand will produce plants of essentially the same character, year after year, generation after generation. We might plant beside this another of somewhat similar aspect, *spearmint*, and this would also reproduce itself generation after generation without change. There would never be an intermingling of the two; the seed of the one would never produce the other, but each would always reproduce itself. Now, then, all the individual peppermint plants existing are the direct descendants of others which preceded them, and those of others still, and we can reasonably trace the chain backward to one common ancestor. The same with spearmint. To express this history of a plant we use the term **species,** signifying all individuals descended from a common stock. Hence the species peppermint comprises all the individuals having its peculiar characteristics, and the species spearmint all the individual mints of this kind.

But these two species bear an evident relationship to each other, as evinced by their square stems, opposite leaves, peculiar flowers and seeds, as well as in their similar but distinct aromatic properties. This relationship is expressed by the term **genus,** which signifies a group of related species.

But if we investigate a little further we shall find many other plants having a general resemblance to these two mints in their manner of growth, mode of flowering, etc. Take catnip, for example. Here we find the square stem, opposite leaves, and a similar mode of flowering, but still some well-marked differences which have placed it in another genus. But these two genera have still marks of relationship which place them, together with many other genera, in a still greater group termed an **order.** Nor do we stop here, for we have seen that a plant may have polypetalous, gamopetalous, or apetalous flowers, and obviously orders of polypetalæ are more nearly related to each other than to gamopetalæ or apetalæ; hence orders are grouped in **divisions.** And again, the three divisions of polypetalæ, gamopetalæ, and apetalæ, being found in exogenous plants, are more nearly related to each other than to endogenous plants; hence the distinction of **classes.** But the two classes of flowering plants are yet more nearly related to each other than to flowerless plants, and another term, **sub-kingdom,** is required to express that fact.

To express this grouping of plants in a natural way we have: **Sub-kingdom. Class. Division. Order. Genus. Species.**

In this system of classification the order, genus, and species has each its distinctive name. Names of orders are often derived from some well-marked characteristic of the plants composing it, as *labiatæ,* an order characterized by labiate flowers; *leguminosæ,* having fruit in the form of a legume; *cruciferæ,* having flowers in the form of a cross. Often, again, they are derived from that of some genus which they include whose name was established before this classification was introduced, as *magnoliaceæ,* from magnolia; *ranunculaceæ,* from ranunculus; *rosaceæ,* from rose; *solanaceæ,* from solanum, etc.

The generic name is in many instances of ancient origin; in other instances it has been derived from names of individuals or from some structural peculiarity, etc.

The specific name most commonly characterizes some structural feature: *Gentiana quinqueflora* (*five-flowered G.*), *G. crinita* (*fringed G.*), etc. It not unfrequently commemorates some individual or country, as *Gentiana Andrewsii* (*Andrews' gentian*), *Cornus Canadensis,* etc., and is then commonly written with an initial capital.

To illustrate the manner in which these names are employed, we will make use of a single example. The order GENTIANACEÆ includes all plants in the known world having the general structure of a gentian, comprising many genera, as *gentiana, sabbatia, frasera,* etc.

The genus *gentiana* includes all the gentians, and their names are written thus:

Gentiana quinqueflora Lamarch—Five-flowered gentian.
Gentiana crinita Froelich—Fringed gentian.
Gentiana Andrewsii Grisebach—Andrews' gentian, etc.

The words Lamarck, Froelich, and Grisebach being the names of the botanists who described the plants and gave them their specific names.

Such is a brief outline of the classification of plants at present employed. It is variously modified to suit circumstances, but these modifications do not require our attention here. There is, however, one point which requires a passing glance. In speaking of species, these were treated of as being absolutely distinctive. Now, in reality this is far from the fact, for often species—as described—are difficult to distinguish one from another. Again, the same species may present plants of, in some respects, different aspects; as for example, a plant whose flowers are habitually blue may produce individuals with white flowers. Now when such variations from the specific standard tend to reproduce themselves year after year, they are termed **varieties**; hence we not unfrequently see the specific name followed by the word *variety* and another name, as *Anemone patens* Linné, **var.** *Nuttalliana* Gray, signifying that the plant is a variety of anemone patens as characterized by Linné, which variety was named for Nuttall and described by Gray.

The plants of any region or country arranged systematically according to this—or any other—system of classification is termed the **flora** of that region or country, and such a flora is of immense service to the student who wishes to familiarize himself with the plants about him. With this flora before him and an unknown plant in his hand, he is enabled to trace out analytically, step by step, the relationship of the unknown with the known, and finally to fix the plant's specific location.

We will suppose him with a flowering plant in his hand, but one which he has never seen before. He begins by ascertaining whether it be exogenous or endogenous; if exogenous, whether polypetalous, gamopetalous, or apetalous; and then whether it bear evident relationship to plants of any order with which he is familiar. If not, he must search through the characters of orders until he can fix its ordinal location, then its generic place, and finally its specific name. For facilitating such analyses artificial keys are supplied in most published floras.

A medical flora, such as is attempted in the second part of this volume, is an orderly arrangement of the medicinal plants of any region or country. Obviously a key cannot readily be availed of in such a work, for, to be of any service, it must be capable of application to all the plants which the territory includes.

GLOSSARY

OR

DICTIONARY OF BOTANICAL TERMS.

(COMBINED WITH AN INDEX.)

Acaulescent, without an apparent stem—the true leaf- and flower-bearing stem being short or subterranean.

Achenium (or akene), a dry 1-seeded fruit, Fig. 82, p. 41.

Acicular, needle-shaped.

Acrogenous, growing only from the summit, as the stems of ferns and mosses.

Aculeate, armed with prickles.

Acuminate, taper-pointed.

Acute, sharp-pointed.

Adnate (anther), attached by one face to the side of the filament, p. 33.

Adventitious roots, p. 6.

Adventitious roots of parasitic plants, Fig. 13, p. 7.

Air-plants, those nourished by aërial roots, p. 9.

Akene (or achenium), a dry 1-seeded fruit, Fig. 82, p. 41.

Alate, winged.

Albumen, p. 45.

Alburnum, sap-wood, p. 15.

Alternate, one after another, as alternate leaves.

Alveolate, like honeycomb.

Andrœcium, a collective name for the stamens.

Annual, a plant which germinates from the seed, produces flowers and fruit, and dies the same season, p. 9.

Annual rings (of wood), Fig. 19, p. 14.

Anther, the essential part of the stamen, Figs. 59, 73, 74, p. 32.

Apetalous, without a corolla, p. 32.

Aphyllous, destitute of leaves.

Appressed, in close contact but not united.

Arboreous (or arborescent), tree-like.

Arillus (or aril), a fleshy, false coating to the seed, p. 45.

Aristate, armed with a bristle-like point.

Articulation, the joint at which a part separates, as the petiole from the stem, p. 20.

Ascending stem, one which arises obliquely, p. 10.

Assurgent, ascending.

Awn, a bristle-like appendage.

Axil, the angle on the upper side between the leaf and stem.

Axillary bud, a bud placed in the axil of a leaf. Axillary buds often remain dormant indefinitely ; when they begin to grow they become terminal buds, *i.e.*, buds terminating growing branches, p. 10.

Baccate, like a berry.

Barbate, bearded.

Bark, p. 15.

Bast-cells, the long wood-cells of bark, p. 15.

Beaked, ending in a beak or narrow tip.

Bean, its structure and germination, Figs. 1–5, p. 2.

Berry, a fruit pulpy or juicy throughout, Fig. 79, p. 40.
Bicarinate, two-keeled.
Bidentate, with two teeth.
Biennial, a plant which germinates from the seed one season and produces flowers and fruit and dies the next, p. 9.
Bifid, two-cleft.
Bifoliate, with two leaflets.
Bilabiate, two-lipped.
Bilocular, two-celled.
Bipartite, two-parted.
Bipinnate, twice pinnate, Fig. 31, p. 21.
Biserrate, doubly serrate, as when the teeth of a serrate leaf are themselves serrate.
Blade (or lamina), the expanded portion of a leaf, p. 17.
Bracts, the leaves of inflorescence, p. 25.
Bractlets (or bracteoles), secondary bracts.
Branches (and stem), p. 9.
Buds and leaves, p. 17.
Bulb, a short, usually scaly and subterranean stem, Figs. 16–18, p. 11.

Caducous, falling off quickly, p. 31.
Cæspitose, growing in tufts.
Calyx, the external floral envelope, p. 31.
Cambium layer, p. 15.
Canaliculate, channelled.
Cancellate, resembling lattice-work.
Canescent, grayish-white, hoary.
Capitate, head-like.
Capsule (or pod), a dry seed-vessel which splits open in a regular manner, p. 43.
Carina, a keel.
Carinate, keeled.
Carpel, a simple pistil or one division of a compound pistil.
Caruncle, an excrescence at the scar of some seeds.
Caryopsis, a fruit having the pericarp incorporated with the seed, p. 42.
Catkin (or ament), Figs. 46, 47, p. 28.
Caudate, tailed.
Caulicle (or radicle), the stem part of the embryo, p. 45.
Cauline, belonging to the stem, as cauline leaves.
Chlorophyll, the green coloring matter of plants, p. 24.
Cinereous, ashy-gray.
Circinate, rolled inward from the top.
Class (of plants), p. 47.
Classification of plants, p. 46.
Claw, the narrow, stalk-like base of some petals.
Cleft, cut more than half-way to the base, p. 19.
Climbing, rising by clinging to other objects. Plants climb in many different ways: by twining, by means of adventitious roots, by tendrils, by the petioles of the leaves, etc.
Column, the united stamens, or stamens and pistils of some plants.
Complete (flower), having calyx, corolla, stamens, and pistils, p. 37.
Compound leaf, Fig. 30, p. 20.
Compressed, flattened on opposite sides.
Concentric rings (of wood), Fig. 19, p. 14.
Cone, the fruit of the *Coniferæ*, Fig. 93, p. 44.
Connate, leaves united about the stem, p. 23.
Contracted, narrowed or shortened.
Coriaceous, leathery.
Corm, a fleshy bulb, p. 12.
Corolla, the inner floral envelope, p. 31.
Cortical, pertaining to the bark (*cortex*).
Corymb, a sort of flat or convex flower-cluster, Figs. 39, 40, p. 26.
Cotyledons (or seed-leaves), the first leaves of the embryo, Figs. 1–3, pp. 2, 45.
Crenate, scalloped, Fig. 28, p. 19.
Cryptogamous (or flowerless) *plants*, p. 45.
Cuneate, wedge-shaped.
Cup (or cupule), the involucre in which an acorn rests, p. 42.
Cuspidate, armed with a small cusp, or tooth.
Cyme, a sort of flat-topped flower-cluster, Fig. 50, p. 29.

Decandrous, with ten stamens.
Deciduous, falling off, as leaves which fall in autumn, p. 22.
Declined, turned to one side.
Decompound, several or many times compounded or divided, p. 21.
Decurrent (leaves), prolonged down the stem.
Definite, a fixed number.
Dehiscent (fruits); opening at maturity, p. 41.

Dentate, toothed, Fig. 28, p. 19.

Depressed, flattened vertically.

Determinate inflorescence, p. 25.

Diadelphous (stamens), united by their filaments into two sets, p. 32.

Diandrous, having two stamens.

Dichotomous, forked.

Didynamous, having four stamens in two pairs, one of which is shorter than the other.

Digitately veined, p. 19.

Digynous, having two pistils or styles.

Diœcious (plants), those which have staminate and pistillate flowers on different individuals, Figs. 46, 47, p. 36.

Dissepiments, the partitions of an ovary or fruit.

Divided, cut to the base, p. 20.

Division (of plants), p. 47.

Drupe, a stone-fruit, p. 41.

Ducts (or vessels), Fig. 23, p. 14.

Duramen, heart-wood, p. 15.

Echinate, armed with prickles.

Emarginate, notched at the apex.

Embryo (or germ), the rudimentary plantlet in the seed, p. 45.

Endocarp, the inner layer of the pericarp, p. 40.

Endogenous plants, without distinction of bark, wood, and pith, Fig. 25, p. 16.

Ensiform, sword-shaped.

Entire, the margins not toothed or indented.

Epicarp, the outer layer of the pericarp, p. 40.

Epidermis, the outer covering or skin.

Epigynous, upon the ovary, p. 37.

Equally pinnate, with leaflets in pairs, p. 20.

Erect stem, one growing straight up, p. 10.

Erose, eroded, appearing as if gnawed.

Essential floral organs, those necessary to reproduction, namely, stamens and pistils, p. 32.

Exogenous plants, with bark, wood, and pith, each distinct, Fig. 19, p. 12.

Exstipulate, without stipules.

Extrorse (anther), fixed to the side of the filament which looks away from the pistil, p. 33.

Falcate, scythe-shaped.

Fascicle, a close cluster, p. 30.

Fascicled roots, those which grow in a bundle or cluster, p. 5.

Filament, the part of the stamen which supports the anther, p. 32.

Flavescent, yellowish, or turning yellow.

Fleshy fruits, p. 40.

Flora, the plants of a district or country, or a systematic arrangement and description of them.

Floral organs, p. 31.

Flower, p. 25.

Flower-bud, p. 25.

Flowerless (or cryptogamous) *plants*, p. 45.

Foliaceous, leaf-like.

Follicle, a fruit which opens along its inner suture, Fig. 88, p. 43.

Footstalk (or petiole), the stem of a leaf, p. 17.

Foveate, deeply pitted.

Fruit, p. 40.

Functions of leaves, p. 24.

Functions of roots, p. 8.

Functions of stem and branches, p. 16.

Functions of the flower, p. 38.

Fusiform, spindle-shaped.

Galeate, helmet-shaped.

Gamopetalous, monopetalous, p. 32.

Gamosepalous, monosepalous, p. 31.

Geniculate, bent like a knee.

Genus, p. 47.

Germ (or embryo), the rudimentary plantlet in the seed, p. 45.

Glabrous, smooth.

Glands, small cellular organs which secrete oily, resinous, or other products.

Glaucous, covered with a bloom—a fine white powdery coating which rubs off, as the bloom of a grape.

Glomerule, a dense head-like cluster, p. 30.

Gymnospermous, naked-seeded.

Gynœcium, a collective name for the pistils.

Gynandrous, with stamens and pistils united.

Habitat, the situation in which a plant grows without cultivation.

Hairs, hair-like appendages on the surface of plants.

Half-superior (calyx), partially enclosing the ovary, Fig. 72, p. 37.

Hastate, halberd-shaped.

Head, the inflorescence of the so-called compound flowers, Figs. 48, 49, p. 28.

Heart-wood (or duramen), the older, often colored wood of exogenous stems.

Herb, a plant which dies altogether, or down to the ground, after maturing its fruit.

Herbaceous, having the texture of an herb, *i.e.*, with little woody tissue, p. 12.

Hilum, the scar on the seed marking its former attachment to the seed-vessel, pp. 2, 45.

Hoary, grayish-white.

Horn, a spur or other like appendage.

Hybrid, a cross-breed, p. 39.

Hypogynous, inserted below the pistils, Figs. 67, 68, p. 37.

Imbricate, overlapping one another.

Impari-pinnate, unequally pinnate.

Incanous, hoary with white pubescence.

Indefinite, not uniform in number, or very numerous.

Indehiscent (fruit), not opening at maturity, p. 41.

Indeterminate inflorescence, p. 25.

Indian corn, its structure and germination, Figs. 6–9, p. 3.

Indigenous, native to the country.

Induplicate, with edges turned inward.

Inflorescence, the arrangement of flowers, p. 25.

Infundibuliform, funnel-shaped.

Innate (anther), attached by its base to the apex of the filament, p. 33.

Internode, the space between two nodes or joints, p. 9.

Introrse (anther), fixed to the side of the filament which looks toward the pistil, p. 33.

Involucel, the bracts at the base of a partial umbel, p. 28.

Involucre, a whorl of bracts about the base of a single flower, an umbel or a head.

Involute, rolled inward from the edges.

Irregular, with like parts dissimilar, as an irregular corolla, one with some of its petals unlike the others.

Joint (or node), that part of a stem from which a leaf or leaves spring.

Keel, a projection like the keel of a boat.

Kernel, p. 44.

Labellum, the odd petal of orchidaceous plants.

Laciniate, slashed or cut into narrow lobes.

Lanuginous, cottony or woolly.

Lamina (or blade), the expanded portion of a leaf, p. 17.

Leaflets, the separate blades of a compound leaf, Fig. 30, p. 20.

Legume, a pod which opens along both sutures, Fig. 89, p. 43.

Lenticular, lens-shaped.

Liber, the inner, fibrous bark of exogenous plants.

Ligule, the strap-shaped corolla of many compositæ.

Limb, the free border of a monosepalous calyx or monopetalous corolla, pp. 31, 32.

Linear, narrow and flat.

Lip, the principal lobes of a bilabiate calyx or corolla.

Lobe, a prominent division, as of a leaf, p. 19.

Loculicidal (dehiscence), opening down the back of each cell, p. 43.

Lyrate, lyre-shaped.

Medullary rays, cellular tissue connecting the pith and growing surface of the stem, Fig. 24, p. 14.

Mesocarp, the middle layer of the pericarp, p. 40.

Micropyle, the closed orifice of the seed, p. 45.

Mid-rib, p. 17.

Mid-vein, p. 17.

Mixed inflorescence, p. 31.

Monadelphous (stamens), united by their filaments into one set, p. 32.

Monandrous (flower), having but one stamen.

Moniliform, necklace-shaped.

Monœcious (plant), one with staminate and pistillate flowers on the same individual, p. 36.

Monogynous, having but one pistil.

Monopetalous, with petals more or less united, Fig. 56, p. 32.

Monosepalous, with sepals more or less united, Fig. 53, p. 31.

Mucronate, armed with a small sharp point.

Multilocular, many-celled.

Naked, destitute of both calyx and corolla, p. 32.

Nerves (of leaves), p. 17.

Net-veined leaves, common to exogenous plants, p. 18.

Node (or joint), that part of the stem from which a leaf or leaves spring, p. 9.

Numerical arrangement (flower), Figs. 64–66, p. 35.

Nut, a dry indehiscent fruit having a woody or bony shell, p. 42.

Ochroleucous, yellowish-white.

Order (of plants), p. 47.

Ovary, the organ which contains the ovules, Figs. 62, 75, p. 33.

Ovule, the rudimentary seed, Figs. 75, 77, 78, p. 33.

Palmately compound, p. 20.

Palmately veined, Fig. 18, p. 19.

Panicle, a compound raceme, p. 26.

Pappus, a tuft of bristles or hairs crowning the achenia of the *Compositæ*, Fig. 82, p. 41.

Parallel-veined leaves, common to endogenous plants, p. 18.

Parietal (placentæ), attached to the walls of the ovary.

Parted, deeply cut, p. 20.

Pedately veined, p. 19.

Pedicel, a secondary peduncle.

Peduncle, a branch terminated by a flower, p. 25.

Pentagynous, with five pistils or styles.

Pentandrous, with five stamens.

Pepo, the fruit of the gourd family, p. 41.

Perennial, a plant which lives several or many years, p. 9.

Perfect (flower), having both kinds of essential organs, p 37.

Perfoliate, a leaf which appears to be perforated by the stem, p. 23.

Perianth, the floral envelopes.

Pericarp, the matured ovary, or seed-vessel, p. 40.

Perigynous, petals and stamens inserted upon the calyx, Figs. 69, 70, p. 37.

Petaloid, like a petal or petals, as a petaloid calyx.

Petals, the separate leaflets of the corolla, p. 31.

Petiole (or footstalk), the stem of a leaf, p. 17.

Pilose, hairy.

Pinnæ, primary branches of a bipinnate or tripinnate leaf, p. 21.

Pinnately compound, p. 20.

Pinnately (or feather) *veined*, Fig. 26, p. 18.

Pinnules, secondary branches of a bipinnate or tripinnate leaf, p. 21.

Pistil, the organ which is fertilized and bears the seeds, Fig. 62, p. 33.

Pistillate (flower), one with pistils, but without stamens, Fig. 47, p. 36.

Pitcher, p. 22.

Pith, the central mass of cellular tissue of exogenous stems, Figs. 20, 21, p. 13.

Plicate, plaited.

Plumose, feathery.

Plumule, the rudimentary bud of the embryo, p. 45.

Pollen, the fertilizing element, Fig. 76, pp. 32, 38.

Pollen-tube, Figs. 75, 78, p. 38.

Polyadelphous (stamens), united by their filaments into several sets, p. 38.

Polygamous (plants), having staminate, pistillate, and perfect flowers on the same individual, p. 36.

Polypetalous, with petals distinct, Fig. 55, p. 32.

Polysepalous, with sepals distinct, Fig. 52, p. 31.

Pome, the apple, pear, and similar fruits, p. 41.

Prickles, sharp elevations of the bark.

Primary roots, p. 5.

Prostrate stem, one which lies flat on the ground.

Pubescent, hairy or downy with soft hairs.

Punctate, dotted.

Putamen, the stone of stone-fruits.

Pyxis, a pod which opens transversely, Fig. 92, p. 44.

Raceme, an inflorescence with nearly equal secondary axes along the primary one, Fig. 38, p. 26.

Radiate, furnished with ray-flowers.

Radical, proceeding from the root, as radical leaves.

Radicle (or caulicle), the stem part of the embryo, p. 45.

Ray, the marginal flowers of a head, when ligulate or different from the others.

Receptacle, the axis or support of a flower, p. 25.

Regular (flower), with all parts of each set alike, p. 37.

Repand, wavy-margined, p. 19.

Retuse, blunted and somewhat indented.

Rhachis, the axis of a spike or other body.

Rhizome (or rootstock), a creeping subterranean stem, Fig. 15, p. 11.

Ribs (of leaves), p. 17.

Ringent, gaping open.

Root, pp. 4, 7.

Root-hairs, Fig. 14, p. 8.

Rootstock (or rhizome), a creeping subterranean stem, Fig. 15, p. 11.

Rostrate, beaked.

Rotation of crops, p. 8.

Runcinate, coarsely saw-toothed.

Runner, a slender prostrate branch, rooting at the end or joints.

Samara (or key-fruit), a winged achenium, Figs. 86, 87, p. 42.

Sarcocarp, a thick, fleshy mesocarp, p. 40.

Scabrous, rough to the touch.

Scales, reduced leaves, p. 17.

Scandent, climbing.

Scape, a peduncle rising from the ground or near it.

Scarious, thin, dry, and membranous.

Scorpoid cyme (or raceme), Fig. 51, p. 30.

Scutellate, saucer-shaped.

Secondary roots, p. 6.

Secund, one-sided, as a one-sided raceme.

Seed, p. 44.

Sepals, the separate leaflets of the calyx.

Septicidal (dehiscence), cells first separating from each other, then opening along their inner margin, p. 43.

Sericeous, silky.

Serrate, saw-toothed, Fig. 28, p. 19.

Sessile, without a stalk, as a sessile leaf, one without a petiole, p. 17.

Setaceous, bristle-form.

Sheathing, wrapped about the stem.

Shrubs, woody plants under about twenty feet in height, p. 12.

Silicle, a short, broad silique, p. 43.

Silique, the pod of the *Cruciferæ*, Fig. 91, p. 43.

Simple leaf, Fig. 29, p. 20.

Simple stem, one without branches, p. 10.

Sinuate, strongly wavy, Fig. 28, p. 19.

Spathe, a bract which enfolds an inflorescence.

Species, p. 46.

Spike, an inflorescence with flowers sessile on the primary axis, Figs. 43, 44, p. 28.

Spine, a thorn.

Spores, p. 46.

Squarrose, with thickly set scales, leaves, or other appendages, spreading widely from the axis.

Stamen, Fig. 59, p. 32.

Staminate (flower), one with stamens but without pistils, Fig. 46, p. 36.

Standard, the upper petal of a papilionaceous flower.

Stem (and branches), p. 9.

Stigma, the part of the pistil on which the pollen is deposited, Figs. 62, 75, p. 34.

Stipe, the stem of a pistil when it has any.

Stipulate, furnished with stipules.

Stipules, appendages at the base of certain leaves, Figs. 32–34, p. 23.

Stomata (stoma, singular), the breathing-pores of leaves, Figs. 36, 37, p. 24.

Stone-fruit, p. 41.

Strict, close and narrow.

Strobile, a multiple, cone-shaped fruit, like that of the common hop.

Style, the portion of the pistil between the ovary and stigma, Fig. 62, p. 34.

Sub-kingdom (of plants), p. 47.

Succulent, juicy.

Suffruticose, slightly woody, p. 12.

Superior (calyx), enclosing the ovary, Fig. 71, p. 37.

Symmetrical (flower), with the same number of parts in each set, p. 37.

Syngenesious (stamens), with anthers united into one set, Figs. 60, 61, p. 33.

Tap-root, a root with a stout tapering body, Fig. 10, p. 4.
Tegmen, the inner seed-coat.
Tendril, a modified branch or leaf used for climbing.
Terminal bud, the bud terminating the main stem or a growing branch, p. 10.
Ternate, in threes.
Testa, the external seed-coat, p. 44.
Tetradynamous, having six stamens, two of them shorter than the others.
Thickened fascicled roots, Fig. 11, p. 5.
Throat, the point where the tube and limb of a monosepalous calyx or monopetalous corolla meet, pp. 31, 32.
Thyrse, an ovoid panicle, p. 26.
Trailing stem, one which runs over the surface of the ground or other objects.
Trees, woody plants of a greater height than twenty feet, p. 12.
Tri-pinnate, thrice pinnate.
Truncate, cut off.
Tube, the undivided portion of a monosepalous calyx or monopetalous corolla, pp. 31, 32.
Tuber, a thickened, bud-bearing portion of a subterranean stem, p. 12.
Twining stem, one which climbs by twining about some support, p. 10.

Umbel, an umbrella-like inflorescence, Figs. 41, 42, p. 26.
Umbellet, a secondary umbel, p. 28.
Uncinate, hook-shaped.
Unequally pinnate, with leaflets in pairs surmounted by an odd terminal one, Fig. 30, p. 21.
Unguiculate, furnished with a claw.
Unisexual, having stamens or pistils only.
Utricle, an achenium with a loose, bladdery pericarp.

Valvate, opening by valves.
Valve, one of the parts of a dehiscent pod or similar body which opens.
Varieties (of plants), p. 47.
Veinlets (of leaves), p. 17.
Veins (of leaves), p. 17.
Venation, the veining of leaves, p. 17.
Ventricose, inflated on one side.
Verrucose, warty.
Versatile (anther), attached at its middle so as to turn easily, p. 33.
Verticil, a whorl.
Verticillate branches, p. 10.
Vessels (or ducts), Fig. 23, p. 14.
Vexillum, the standard of papilionaceous flowers.
Villose, shaggy with long, soft hairs.

Wood, Figs. 22, 23, p. 13.
Woody, having the texture of wood, p. 12.

MEDICINAL PLANTS

OF

NORTH AMERICA.

PHÆNOGAMOUS OR FLOWERING PLANTS.

CLASS I. — DICOTYLEDONOUS OR EXOGENOUS PLANTS.

Stems with bark, wood, and pith distinct; when perennial, increasing in size by the annual addition of a layer of wood outside that already formed. Leaves net-veined. Parts of the flower commonly in fives or fours. Embryo with two cotyledons, or seed-leaves, rarely with several in a whorl.

Division I.—Polypetalous Exogenous Plants.

Flowers with both calyx and corolla, the latter absent in only a few genera and species. Petals each separate and distinct.

RANUNCULACEÆ.

Character of the Order.—Calyx: sepals 3 to 6, generally 5, distinct, usually deciduous, and, except in clematis, imbricated in the bud. Corolla: petals 3 to 15, occasionally irregular or deformed, and sometimes absent. In the latter case the sepals are usually colored, and petal-like. Stamens indefinite, distinct, very rarely few and definite. Ovaries numerous, rarely few or solitary, distinct. Ovules solitary or several, inverted. Fruit either achenia, seed-like, dry follicles, or berries; seeds solitary or several. Embryo minute, at the base of fleshy or horny albumen.

Herbs, rarely shrubs, occasionally shrubby climbing plants. Leaves alternate, opposite in clematis, variously divided, without stipules.

Almost the entire order is characterized by a colorless, acrid, and often poisonous juice. The acrid principle is, however, generally volatile, and is often entirely dissipated in the process of drying. Occasionally, as in aconite, the active principle is stored up more abundantly and permanently in a tuberous root.

Though the ranunculaceæ are represented in the United States by a comparatively large number of genera and species, few of these have as yet been found worthy a place in the Pharmacopœia. Doubtless further careful investigation in this field may yield important results.

CLEMATIS.—VIRGIN'S-BOWER.

Character of the Genus.—Calyx: sepals 4, rarely more, colored, petaloid, the valvate margins turned inward in the bud. Corolla none, or, if present, the petals small. Stamens indefinite in number, distinct. Ovaries numerous, distinct. Achenia in a head bearing the persistent styles as naked, hairy, or plumose tails.

Perennial, herbaceous or slightly woody plants, generally climbing by means of their leaf-stalks; occasionally low and erect. Leaves opposite.

Clematis Viorna Linné.—*Leather-Flower.*

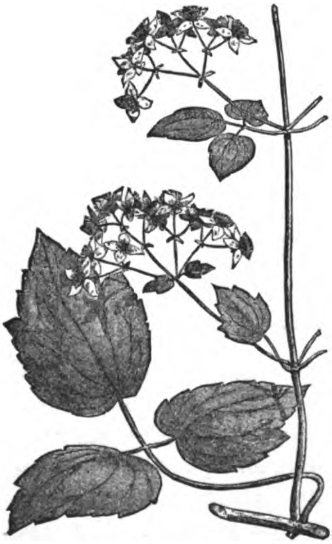


FIG. 96.—Clematis Virginiana.

Description.—Calyx ovate, at length bell-shaped, the purplish sepals very thick and leathery, tipped with short recurved points. Corolla wanting. The long tails of the fruit very plumose.

An herbaceous climber. Leaves pinnate; leaflets 3 to 7, ovate or oblong, sometimes slightly cordate, 2- to 3-lobed or entire; the uppermost often simple. Peduncles bearing single, large, nodding flowers, which appear from May to August.

Habitat.—In rich soil from Pennsylvania to Ohio and southward.

Clematis Virginiana Linné.—*Common Virgin's-Bower.*

Description.—Flowers polygamo-diœcious. Calyx: sepals small, obovate, spreading, white. Corolla wanting. Fruit with conspicuous feathery tails. An herbaceous perennial. Stem climbing and running freely over shrubs, fences, etc. Leaves ternate; leaflets ovate, acute, cut or lobed, somewhat cordate at the base. Flowers in axillary panicled clusters, appearing in August.

Habitat.—On the alluvial banks of streams and along fences; common from Canada to Florida.

Parts Used.—The fresh leaves, flowers, and stem—not official.

Constituents.—The above-described species of clematis, as well as many others, both indigenous and foreign, possess an acrid principle whose exact nature is as yet undetermined. It is of a volatile character, however, and is dissipated by heat, and in the process of drying the plants.

Preparations.—Alcohol is a solvent for the active principle of clematis, and an alcoholic tincture of the fresh plant the best preparation.

Medical Properties and Uses.—Clematis appears to be little more than an acrid irritant. Applied externally, the leaves of some species strongly irritate and even vesicate the skin. Administered internally, in small doses, it may produce diuresis and diaphoresis; in large doses, active purgation. It has been employed in syphilis, scrofula, chronic rheumatism, etc., but without ever attaining an established reputation. It is used at present almost exclusively by homœopathic practitioners.

ANEMONE.—WIND-FLOWER.

Character of the Genus.—Calyx: sepals many, distinct, petaloid. Corolla none, or with petals resembling abortive stamens. Stamens numerous, distinct. Ovaries numerous, distinct. Achenia pointed or tailed, flattened, not ribbed.

Perennial herbs, with radical leaves, those of the stem two or three together, forming an involucre some distance below the flower.

Anemone patens Linné, **var. Nuttalliana** Gray.—*Pasque-Flower.*

Description.—Calyx: sepals 6, purplish or white, 1½ inch long, spreading. Stem simple, erect, naked except the involucre, bearing a single terminal flower which develops in advance of the leaves. Leaves ternately divided, the lateral divisions 2-parted, the middle one stalked, 3-parted, the segments deeply once or twice cleft into narrowly linear and acute lobes. Lobes of the involucre like those of the leaves, united at the base into a shallow cup. The entire plant is villous with long silky hairs. It blooms in March and April.

Habitat.—In prairie regions from Illinois westward and northward.

Part Used.—The herb—*United States Pharmacopœia.* The official name, *Pulsatilla,* includes the herb not only of this plant but of *A. pulsatilla* and *A. pratensis* also.

Constituents.—All parts of the fresh plant are extremely acrid; applied to the skin it causes irritation and even vesication. This acrid property is diminished or wholly lost by drying and long keeping; hence to be efficacious it should be used as fresh as possible, or at least preparations made from the recent plant should be employed. The acridity of pulsatilla is due to the presence of *anemonin,* a crystalline substance which is exceedingly liable to change and is destroyed by heat.

Preparations.—None are official. An alcoholic tincture of the fresh plant is reliable.

Medical Properties and Uses.—Pulsatilla is an acrid irritant which, in large doses, has often produced serious and alarming effects. In safe medicinal doses, however, its effects are by no means so well known. At various times and by numerous authors it has been highly praised as a remedy in diseases of the eye, in rheumatism, amenorrhœa, dysmenorrhœa, etc. In this country it has been employed chiefly by homœopathic practitioners, and usually in very minute doses. Many of the results claimed for it under such circumstances are at least doubtful. Certain it is that other practitioners have not been able to confirm them. A few years since it was highly recommended as a remedy in gonorrhœal epididymitis, and many cases were recorded tending to prove its efficacy, but subsequently cases treated without medicine were shown to make quite as satisfactory progress. The author has employed it in a number of cases of this affection but without any apparent effect. He has also employed it in numerous cases of dysmenorrhœa, generally of hysterical subjects, and though he has frequently observed decided relief from pain during one or two menstrual periods, he is more inclined to attribute this to the mental and moral effect of a new remedy given with the positive assurance that relief would follow,

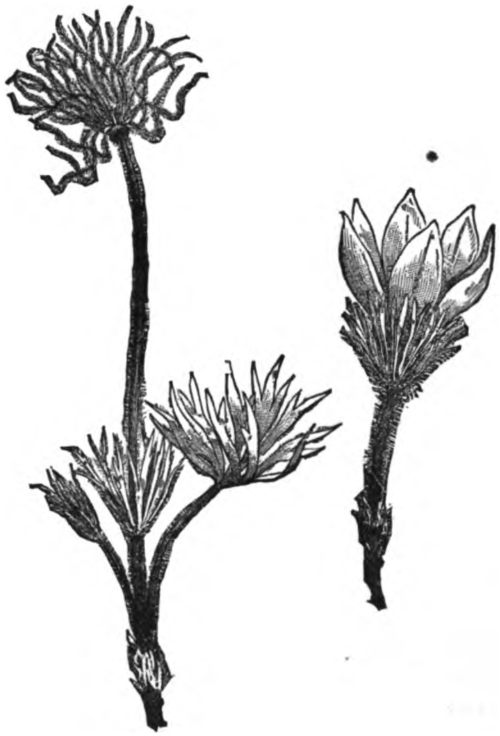


FIG. 97.—Anemone patens, var. Nuttalliana.

than to the medicinal effect of the drug. For in some instances, after pulsatilla had lost its effect, a new drug—it has appeared to matter little just which one—has again given temporary relief.

As a remedy in rheumatism, dropsy, paralysis, etc., pulsatilla does not require serious attention. That its acrid and irritating properties might be made available in stimulating excretion is possible, but our knowledge is at present too limited to establish the point, and other better known agents are always at hand.

HEPATICA.—LIVERWORT.

Character of the Genus.—Involucre of 3 leaflets placed close to and enveloping the flower bud, but becoming more distant after expansion by the growth of the intervening portion of the scape; otherwise similar to anemone, of which genus many botanists consider this only a section. The name hepatica has, however, become so well known that it ought to be retained for sentimental, if not for scientific reasons.

Perennial herbs, with a short rootstock and numerous strong fibrous rootlets. Leaves all radical, of a thick leathery texture, persisting through the winter, the new ones appearing after the flowers, the old ones then withering away. The mature leaves have a dark brownish color, variegated with irregular lighter-colored spots, somewhat resembling that of the liver, whence the common name. Flowers numerous, on slender hairy scapes, each bearing a single one. They appear early in spring, soon after the snow is gone.

Hepatica triloba Chaix.—*Round-lobed Hepatica.*

Description.—Sepals 6 to 9, white, purplish, or blue. Leaves with 3 rounded, obtuse lobes; leaflets of the involucre also obtuse.

Habitat.—In upland woods; common both here and in Europe.

Hepatica acutiloba De Candolle.—*Sharp-lobed Hepatica.*

Description.—Sepals 7 to 12, white, pinkish, or pale purple. Leaves with 3 acute or pointed lobes; occasionally 5-lobed; leaflets of the involucre also acute.

Habitat.—Widely distributed, like the preceding, but less common.

Part Used.—The leaves—not official.

Constituents.—Common vegetable principles, such as mucilage, sugar, tannin, etc.

Preparations.—Used in decoction and syrup.

Medical Properties and Uses.—As a medicine hepatica is wholly inert, and unworthy a place in the materia medica.

RANUNCULUS.—CROWFOOT.—BUTTERCUP.

Character of the Genus.—Calyx: sepals generally 5, sometimes but 3. Corolla: petals generally 5, sometimes more, occasionally but 3. Stamens commonly numerous, occasionally few, always distinct. Ovaries numerous, distinct. Achenia aggregated in a head.

Annual or perennial herbs, with alternate stem-leaves. Flowers solitary or corymbed, generally yellow, sometimes white.

All the ranunculi possess an acrid principle of a volatile nature; few of them have been used medicinally.

Ranunculus bulbosus Linné.—*Bulbous Crowfoot* or *Buttercup.*

Description.—Calyx: sepals 5, smaller than the petals, reflexed. Corolla: petals 5 to 7, round, wedge-shaped below, with a small scale at the base, deep, shining yellow. Achenia with a short beak, collected in a globular head.

A perennial herb growing erect from a bulbous base; leaves and stem hairy. Radical leaves ternately divided, the lateral divisions sessile, the terminal stalked and 3-parted, the divisions wedge-shaped, cut, and toothed. Flowers solitary, large, on long furrowed peduncles; they appear throughout the summer.

Habitat.—A native of Europe; naturalized in the Northern Atlantic States, growing in meadows and pastures.

Ranunculus repens Linné.—*Creeping Crowfoot.*

Description.—Calyx: sepals 5, spreading, smaller than the petals. Corolla: petals 5, obovate, with a small scale at the base, bright yellow. Carpels strongly margined, pointed by a stout, nearly straight beak, collected in a globular head.

A low perennial, hairy or nearly smooth, with the stem ascending, or creeping along the ground. Leaves ternately divided, the divisions mostly stalked, wedge-shaped or ovate, unequally 3-cleft or parted, and variously cut. Peduncles furrowed. It blooms throughout the summer.

Habitat.—In wet shady places; common.

Ranunculus acris Linné.—*Tall Crowfoot.*

Description.—Calyx: sepals 5, spreading, shorter than the petals, yellowish-green. Corolla: petals 5, nearly as large as those of *R. bulbosus*, with a scale at the base, bright yellow. Carpels ovate, compressed, smooth, in a globular head.

A perennial herb. Stem erect, 2 to 3 feet high, hairy. Leaves mostly stalked, deeply divided into 3, 5, or 7 palmate segments, which are cut into lanceolate or linear acute lobes. Peduncles round, not furrowed. It blooms in summer.

Habitat.—A native of Europe; naturalized here, and common in meadows, pastures, and waste places.

Ranunculus sceleratus Linné.—*Cursed Crowfoot.*

Description.—Calyx: sepals 5, small. Corolla: petals 5. Scarcely larger than the sepals, pale yellow. Carpels numerous, in oblong cylindrical heads.

A smooth perennial herb. Stem erect, 1 foot high, thick, hollow.

Lower leaves petioled, divided into 3 or more obtusely toothed or lobed segments. It blooms during summer.

Habitat.—In pools and ditches; common both here and in Europe.

The above-described species of ranunculus are the most important of the genus, though many others possess nearly identical properties.

Part Used.—The herb—not official.

Constituents.—The ranunculi are all more or less acrid, some of them extremely so. Little is known of the acrid principle, save that it is volatile, and is diminished or entirely lost by drying and long keeping.

Preparations.—Used only in the fresh state.

Medical Properties and Uses.—The ranunculi are too acrid to render their internal use either desirable or safe. Most of them are avoided by domestic animals; one may often see *R. acris*, for example, growing luxuriantly in pastures where almost every blade of grass is cropped close. Their acrid properties have, however, led to their employment externally as rubefacients or vesicants in cases where other and perhaps better agents were not at hand, or were for any reason contra-indicated. As is well known, cases of idiosyncrasy occur in which cantharides are inadmissible on account of their effect upon the urinary organs. In some such cases ranunculus has been used with good effect. One of the faults of this agent is its extreme violence. The fresh plant, bruised and applied to the skin, may vesicate in an hour or hour and a half, and may possibly produce an ulcer not easy to heal. It is, therefore, far less safe as a rubefacient than mustard, and, as a rule, much less desirable as a vesicant than cantharides. It has been employed to some extent in European countries as an external application in chronic rheumatism, neuralgia, etc., but never sufficiently to have obtained a place in the pharmacopœias. In this country it is used still less, and is little more than mentioned in works on materia medica.

An interesting observation regarding the possible effect of *R. acris* on pregnant cows was reported to the author by his brother, Mr. F. M. Johnson. In a herd of cows pastured for years in succession in an old field thickly beset with this weed, abortion was frequent and troublesome. As soon, however, as this pasture was broken up and the herd moved to another part of the farm in which the plant did not grow, abortion disappeared. Now although, as stated above, domestic animals avoid this plant, yet when feeding where it is very abundant, they must occasionally swallow it accidentally; and though there is no positive proof that the abortions were due to the plant in question, the facts as stated are interesting and significant. It is at least possible that ranunculus exerts an influence upon the reproductive organs like that which is claimed by some for pulsatilla.

COPTIS.

Coptis trifolia Salisbury.—*Goldthread.*

Description.—Calyx: sepals 5 to 7, petal-like, white, deciduous. Corolla: petals 5 to 7, smaller than the sepals, club-shaped, yellow at the base, hollow at the apex. Stamens 15 to 25, hypogynous. Pistils 3 to 10, on slender stalks. Capsules stellately diverging, stalked, oblong, compressed, acuminate with the persistent style, 4- to 8-seeded. Seeds oblong, black, smooth, and shining.

A small perennial, with evergreen leaves arising from a horizontal rhizome which sends off in every direction long slender fibres of a bright yellow color, whence the common name of *goldthread.* Leaves smooth, veiny, somewhat coriaceous, all radical, on long petioles, ternately divided, the leaflets about an inch long, roundish, acute at the base, lobed and crenate, the crenatures acuminate. Scape slender, round, bearing one starry-white flower, about two-thirds of an inch in diameter, and a minute ovate, acute bract some distance below it. Blooms in May.

Habitat.—Swamps and bogs from Canada and the Northern United States southward along the mountains to Maryland.

Parts Used.—The whole plant may be employed, but the rhizomes and rootlets are chiefly used. Formerly official, it has been discarded from the United States Pharmacopœia.

Constituents.—Goldthread has a strongly bitter taste, unattended with astringency. Its most important constituent is *berberina;* another alkaloid, *coptina,* exists in small proportion. The latter appears to bear some analogy to hydrastia. It contains neither tannic nor gallic acid.

Preparations.—There are no official preparations of this plant. It yields its virtues to alcohol and to water. The alcoholic tincture is of a beautiful yellow color, and in cases where alcohol is not contra-indicated, may be employed as fully representing the drug. An infusion is also efficient.

Medical Properties and Uses.—Analysis proves goldthread to be a pure and simple bitter. Clinically it acts like calumba, quassia, and other drugs of this class. It was formerly much used as a wash for aphthous sore mouth, exerting in this instance an influence like that of hydrastis. As a tonic during convalescence, and in weakened condition of the digestive organs, it may be substituted for calumba, quassia, etc., as occasion requires.

HYDRASTIS.

Hydrastis Canadensis Linné.—*Golden Seal, Yellow-Root, Yellow Puccoon.*

Description.—Calyx: sepals 3, small, petal-like, of a pale rose-color, falling away soon after the flower expands. Corolla absent. Stamens very numerous, hypogynous, linear-spatulate; anthers oval, innate. Ovaries 12 or more, 2-ovuled; styles short, stigmas dilated, 2-lipped, induplicate. Fruit a crimson head of baccate 1- or 2-seeded carpels, succulent, and resembling a large raspberry. Seeds obovate; testa crustaceous, nearly black, shining, lined with a thin membranaceous tegmen.

An herbaceous perennial, with a horizontal rhizome, from which is sent up in early spring a simple hairy stem 6 to 12 inches high, bearing two leaves, and, at its summit, a single flower. There is generally also a single radical leaf on a long petiole. The leaves are palmately 3- to 5-lobed, the lobes acute, unequally serrate; the lower cauline leaf petiolate, the upper sessile. The leaves, at the time of flowering, are small and not fully expanded, but subsequently they increase much in size, ultimately attaining a width of 5 to 6 inches.

The rhizome is one-half inch to 2 inches in length, from one-eighth to one-half inch in diameter, simple, or with a few short branches, terminated by a broad scar, longitudinally wrinkled, annulate from leaf scars, and bearing, especially below, numerous small fibrous roots. Both rhizome and roots are of a yellow color, and have an intensely bitter taste, without astringency.

Habitat.—Canada to Carolina and westward. Rare east of the Alleghanies, more common along these mountains and west of them. Grows in rich moist woods.

Parts Used.—The rhizome and rootlets—*United States Pharmacopœia.*

Constituents.—The most important constituents of hydrastis are two alkaloids, viz.: (1) *hydrastia,* a white crystalline body, tasteless at first, but eventually imparting an acrid sensation to the tongue and fauces—not bitter, as sometimes erroneously stated; (2) *berberina,* which is in yellow needle-shaped crystals and has an intensely bitter taste. The latter alkaloid is found in numerous plants of the orders *Berberidaceæ, Ranunculaceæ, Menispermaceæ,* etc. Besides these alkaloids, hydrastis contains starch, sugar, etc., and traces of a third alkaloid, which, however, exists in such small proportion as to be of no practical importance. The article long known as *hydrastin,* and extensively used, chiefly by eclectic practitioners, is an impure hydrochlorate (muriate) of berberina. Both hydrastia and berberina unite with acids to form salts, and it is in the form of salts that they are usually employed.

Preparations.—Extractum hydrastis fluidum—fluid extract of hydrastis; tinctura hydrastis—tincture of hydrastis.—*United States Pharmacopœia.* In certain cases where it is desirable to employ large doses, the alkaloids or their salts are more eligible.

Medical Properties and Uses.—Numerous and diverse properties have been attributed to hydrastis, so much so, indeed, that there is little agreement among different authors upon the subject. That it is a powerful tonic all admit, and it is probable that to its tonic action alone are due the many widely different effects observed by those who have written upon the drug. It has been used successfully as a substitute for quinine in the treatment of intermittents, in convalescence from acute disease, and in general where a vegetable tonic is indicated. This fact is worthy of remembrance, since there are numerous instances in which quinine is indicated but cannot be employed on account of idiosyncrasy. It is not, however, as a substitute for quinine that hydrastis has been most employed or has gained its greatest reputation. It seems to exert an especially tonic influence upon mucous surfaces, and has been employed beneficially in a great variety of catarrhal affections. Prior to its use in scientific medicine it had been employed by the aborigines as a topical application in catarrhal affections of the eyes and as a stimulant to old ulcers. It is still used with benefit in such cases, and in chronic coryza, in gonorrhœa, leucorrhœa, hemorrhoids, and prolapsus ani. That it exerts an influence upon the liver seems well demonstrated, and it has been used with benefit in torpid conditions of this organ, and in catarrhal inflammation of the gall-bladder and gall-duct. Though not directly cathartic in its action, in certain cases of habitual constipation it produces a laxative effect. It has been employed beneficially in glandular swellings, undoubtedly through its general tonic power, and hence has probably derived its undeserved reputation as a remedy for cancer.

XANTHORHIZA.

Xanthorhiza apiifolia L'Heritier.—*Yellow-Root, Shrub Yellow-Root.*

Description.—Calyx: sepals 5, petal-like, deciduous, spreading, ovate-acuminate, brownish-purple. Corolla: petals 5, very small, 2-lobed, elevated upon a claw, colored like the sepals. Stamens 5 to 10, hypogynous, filaments thick, purple, anthers adnate. Ovaries 5 to 15, each bearing two pendulous ovules attached to the middle. Pods 1-seeded, oblong, the style becoming lateral during development.

A shrubby perennial, 1 to 3 feet high, with a large rootstock and numerous round, slightly branched stems. Outer bark gray, smooth, and shining; within bright yellow. Leaves alternate, unequally 1- to 2-pinnate, on long stalks. Leaflets in two pairs with an odd terminal one, 2 to 3 inches long, rhomboid-ovate or lanceolate, tapering at the base, sessile, incisely lobed and dentate, smooth, dark green above, lighter beneath. Flowers polygamous, in long, drooping compound racemes, appearing from April to June. The rootstock is from 3 inches to 1 foot or more in length, from one-eighth to one-half inch in thickness, more or less branched, yellowish-brown externally, internally of a deep yellow, and having an exceedingly bitter taste.

Habitat.—Central New York (one station only) to the middle and upper districts of the Carolinas and Georgia, chiefly along the mountains and highlands.

Parts Used.—The rhizome and roots. Formerly official, it has been discarded from the United States Pharmacopœia.

Constituents.—No exact analysis seems to have been made of this plant, though it has been shown to contain *berberina* in small proportion, and probably to this it owes, in a great measure, its bitterness and tonic properties.

Preparations.—There are no official preparations of yellow-root. It yields its virtues to both water and alcohol, and may be employed in tincture, decoction, infusion, or even in powder, though in the latter form it would be difficult to administer it in efficient doses.

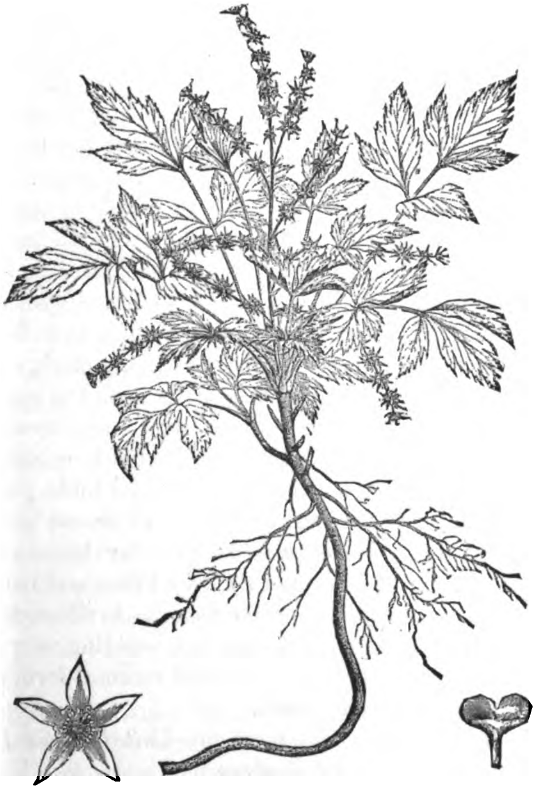


FIG. 98.—Xanthorhiza apiifolia.

Medical Properties and Uses.—Like hydrastis and coptis, both of which it resembles in respect to constituents, xanthorhiza possesses simple bitter tonic properties. It has, however, a much smaller percentage of berberina than either of them, and, so far as this alkaloid goes, should therefore be less efficient when administered in like doses. It has been employed chiefly as a domestic remedy, but some competent observers esteem it more highly than either gentian or calumba.

Cimicifuga racemosa Elliott (*Actæa racemosa* Linné, *Macrotys serpentaria* Eaton).—*Black Snakeroot, Black Cohosh, Bugbane, Squaw Root.*

Description.—Calyx: sepals 4, in pairs, the inner pair smaller, white, falling soon after the flower expands. Corolla: petals 4 to 6, small, stamen-like, on claws, 2-horned at the apex. Stamens numerous, with slender white filaments, hypogynous; anthers adnate. Ovary solitary, flask-shaped, 1-celled, with about 10 sessile ovules in two rows, no style, stigma sessile, forming a dry pod in fruit.

An herbaceous perennial, with a short, thick, horizontal rootstock, from which spring several simple stems, 4 to 8 feet high, bearing, about midway, large, decompound leaves, and at the summit long, wand-like tracemes. Leaves 2 to 3, the lower very large, the upper smaller, alternate, on strong, round, partially clasping petioles, ternate, the primary divisions bi-pinnate; leaflets 1 to 3 inches long, cut-serrate, the terminal one largest, and more or less 3-divided, thin, smooth, of a bright green color. Flowers very numerous, about one-half inch in diameter, in simple or sparsely branched racemes, 8 to 12 inches long; pedicels about one-fourth inch long, bracts subulate, rachis pubescent. The plant flowers early in July in the latitude of New York, and continues in bloom during some weeks, ripening its fruit in September. Rhizome 2 to 6 or more inches in length, one-half to 1 inch thick, horizontal, somewhat flattened, irregularly corrugated and knotted, simple or branched, thickly beset above with the scars and stumps of fallen stems, and laterally and beneath with long, strong roots, one-twelfth to one-eighth inch in diameter. Scattered irregularly among the stumps of previous stems are a number of terminal buds prepared for the next season's stems. The rhizome and roots of recent growth are of a dark reddish-brown color, the older portion of the rhizome almost black; its odor is earthy and unpleasant, and its taste bitter and nauseous.

Habitat.—Common everywhere from Canada to Georgia, growing in rich open woodlands and upon hillsides, but avoiding very wet or rocky places. When in bloom its long and graceful racemes form a conspicuous feature of the localities where it grows.

Parts Used.—The rhizome and rootlets—*United States Pharmacopœia.* Official name: *Cimicifuga—Black Snakeroot.*

Constituents.—Numerous analyses have been made of this plant without, however, yielding any very satisfactory result when considered from a therapeutic standpoint. In addition to the common plant constituents like starch, gum, tannic and gallic acids, mineral salts, etc., a small proportion of volatile oil, having the peculiar odor of the fresh drug, was detected by one analyst, besides two resins of different character. Another analyst found no volatile oil, but isolated a crystalline substance, probably a neutral principle, whose alcoholic solution has an intensely acrid taste. That the fresh drug possesses some active volatile principle would seem probable from the fact that it certainly deteriorates by keeping, and all observers who have had experience in the matter agree that it is therapeutically much more active when fresh than when long kept.

Preparations.—Extractum cimicifugæ fluidum—fluid extract of cimicifuga; tinctura cimicifugæ—tincture of cimicifuga.—*United States Pharmacopœia.* Of the unofficial preparations, the one most employed is an impure resin termed *cimicifugin* or *macrotin,* obtained by precipitation from an alcoholic tincture with water. The drug may also be administered in substance or in decoction, though the latter form is objectionable since water does not completely extract its virtues.

Medical Properties and Uses.—In small or moderate doses cimicifuga is a tonic which may be usefully employed in a great variety of affections, as enfeebled condition of the digestive system due to alcoholism, fevers, phthisis, bronchitis, etc. It has been employed also in acute and chronic rheumatism, amenorrhœa, dysmenorrhœa, and in cardiac disease, where it acts like, but less efficiently than, digitalis. It has been used as an aid to parturition instead of ergot, and after delivery to relieve after-pains, in puerperal mania and convulsions, and as a remedy for chorea, especially when of rheumatic origin. In very large doses it produces a decided sedative effect, causing vertigo, dilatation of the pupil, and a tendency to somnolence. "To obtain curative effects from cimicifuga, it must be administered in sufficiently large doses to produce some of its cerebral effects."—*Bartholow.*

ACTÆA.—BANEBERRY.

Character of the Genus.—Sepals 4 to 5, falling when the flower expands. Petals 4 to 10, small, flat, spatulate, on slender claws. Stamens numerous, hypogynous, with slender white filaments. Ovary solitary, stigma sessile. Fruit a many-seeded berry; seeds compressed, smooth, horizontal. Perennial herbs, with bi-ternately divided leaves, and flowers in a thick terminal raceme.

Actæa spicata Linné, **var. rubra** Michaux.—*Red Baneberry.*

Description.—Calyx: sepals 4, ovate, greenish. Corolla: petals often 8 to 10, white, oval, acute, much shorter than the stamens. Stamens numerous; filaments filiform. Ovary smooth, white; stigma oval, 2-lobed, recurved at the ends. Berries red, shining, about 16-seeded, on long pedicels about one-fourth the size of the common peduncle.

Stem roundish, smooth, about 2 feet high, with bi- or tri-ternately divided leaves, on long smooth petioles, partly sheathing at the base; leaflets ovate, sharply cut, and toothed. Racemes ovate or hemispherical, appearing in April and May. Rhizome closely resembling that of cimicifuga, which see.

Habitat.—Rich woods from Hudson's Bay to Pennsylvania and westward to the Rocky Mountains. Less common than the following.

Actæa alba Bigelow.—*White Baneberry.*

Description.—Calyx: sepals 4, oblong, white. Corolla: petals 4 to 8, as long as the stamens, slender, mostly truncate at the ends, stamen-like, white; filaments shorter than in the preceding species. Ovary and stigma like those of the preceding. Berries white, tipped with red, about 8-seeded, on thickened, red pedicels the size of the common peduncle. Stem and leaves larger and rather smoother than the preceding. Rhizome similar.

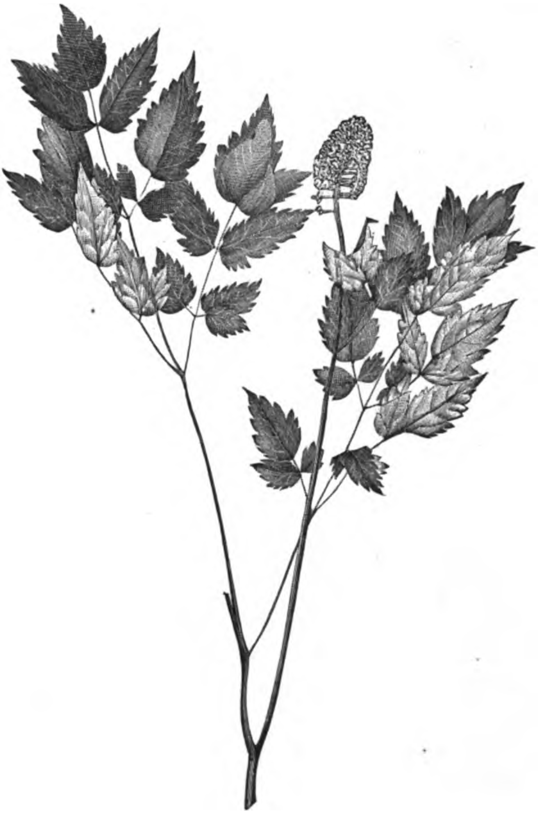


FIG. 99.—Actæa alba.

Racemes oblong, the flowers appearing a week or two later than those of the other species.

Habitat.—Rich woods from Canada to Georgia and westward to the Mississippi.

Parts Used.—The rhizome and roots—not official.

Constituents.—Nothing definite is known as to the composition of these plants, though they are supposed to possess properties similar to those of cimicifuga.

Preparations.—There are no commercial preparations of the American species of actæa. From the apparent similarity of the plants to cimicifuga, they might safely be administered in like manner.

Medical Properties and Uses.—As already remarked, the chemical constituents of actæa are supposed to be similar to those of cimicifuga, and therefore the former might be substituted for the latter in case of necessity, though such necessity is scarcely to be supposed. As domestic remedies both species have been employed, though rarely. In scientific medicine they have seldom been mentioned.

MAGNOLIACEÆ.

Character of the Order.—Trees or shrubs with alternate, coriaceous leaves, and convolute stipules which cover the buds and are deciduous. Sepals usually 3 to 6, deciduous; petals 3 or more, imbricated; stamens numerous, distinct; anthers adnate; carpels 1-celled, numerous, on an elevated receptacle, in fruit forming a sort of fleshy or dry cone.

The order comprises about a dozen genera and more than seventy species, very few of which, however, are indigenous to North America. The flowers of many species are fragrant and ornamental. As a whole the magnoliaceæ are characterized by aromatic tonic properties.

MAGNOLIA.

Character of the Genus.—Sepals 3; petals 6 to 12. Stamens numerous, imbricated, with short filaments, and long anthers, the latter opening inward. Pistils numerous, crowded upon the elongated torus, cohering, and in fruit forming a fleshy and somewhat woody conical mass. Carpels dehiscent upon the back, 1- or 2-seeded, the seeds at maturity being suspended from the open capsules by an extensile thread of spiral vessels. Trees or shrubs. Leaves alternate, or clustered at the summit of the branches. Flowers large, solitary, terminal. Stipules large, adnate to the petiole, deciduous.

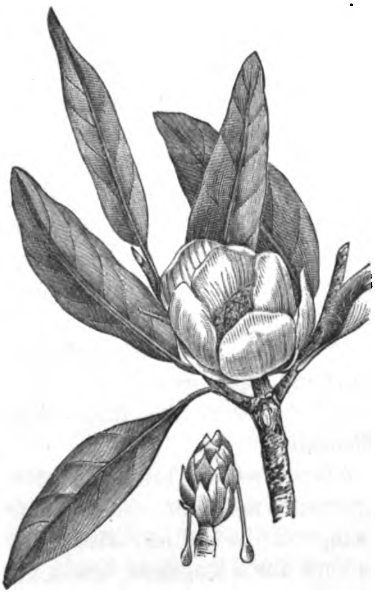


FIG. 100.—Magnolia glauca.

Magnolia glauca Linné.—*Small* or *Laurel Magnolia.*

Description.—Calyx: sepals 3, membranaceous, spatulate, concave, resembling petals but much less delicate. Corolla: petals 9 to 12, ovate, narrowed at the base, concave, erect, arranged in circles of three. Seeds obovate, scarlet.

A shrub 5 to 20 feet high, with divaricating branches and smooth, grayish bark. Leaves oblong or oval, obtuse, coriaceous, of a deep yellowish-green above and glaucous or bluish-white beneath. Bark of young twigs smooth, bright green. Flowers globular, about 2 inches in diameter, creamy-white, and very fragrant. Cone of the fruit oval, 1 to 1½ inch long, greenish.

Habitat.—In swamps from Cape Ann north of Boston, south to Florida mostly near the coast, though occasionally found some distance inland. North of Southern New Jersey it is not very common, nor does it attain any considerable size. In its northern stations the leaves are deciduous, but southward they become persistent. In the latitude of New York it blooms in May and June, and at this season the flowers are collected in large quantities for sale in the cities. It is known by a variety of local names, as *Sweet Bay*, *White Bay*, *Swamp Sassafras*, *Beaver Tree*, etc.

Magnolia acuminata Linné.—*Cucumber Tree.*

Description.—Calyx: sepals 3. Corolla: petals 6 to 9, oblong-ovate, scarcely expanding, glaucous-green tinged with yellow. Fruit cylindrical, about 3 inches long; when green somewhat resembling a young cucumber, whence the common name.

A large tree, 60 to 80 feet high and 4 to 5 feet in diameter at the base. Leaves scattered, oblong, acuminate, 6 to 9 inches long, green above, slightly pubescent beneath, deciduous. Flowers 3 to 4 inches in diameter, slightly fragrant, appearing in May and June.

Habitat.—From Western New York south to Georgia and west to Ohio, in rich woods. In the Southern States it is confined to mountainous districts. The wood somewhat resembles bass-wood (*Tilia*), though it is more compact, and is applied to the same uses.

Magnolia Umbrella Lam. (*M. tripetala* L.).—*Umbrella Tree.*

Description.—Calyx: sepals 3. Corolla: petals 9, oblong-lanceolate, acute, white. Fruit oblong, 4 to 6 inches long, rose-colored.

A small tree, 25 to 35 feet high, with irregular branches. Leaves clustered at the summit of the branches, oblong-lanceolate, 12 to 18 inches long, pointed at both ends, downy beneath, soon becoming smooth, deciduous. Flowers 4 to 6 inches in diameter, white, of an unpleasant odor, appearing in May and June.

Habitat.—From Pennsylvania southward and westward, in deep, rich soils and shady locations.

Part Used.—The bark—*United States Pharmacopœia.* Official name, *Magnolia.*

Constituents.—Both the root and stem bark of the above-described species of magnolia contain an aromatic and a bitter principle: the former being volatile is diminished by desiccation and entirely lost when the bark is kept for a length of time. The bitter principle is permanent, but has not been isolated; it is not associated with any astringent. A crystalline principle has been discovered in some of the species, but its therapeutic action, if it have any, has not been demonstrated.

Preparations.—There are no official preparations. The bark yields its virtues readily to diluted alcohol, and a tincture prepared by means of this menstruum is an eligible form in which to administer the drug. It may also be given in powder or infusion, though in the latter form the aromatic property is greatly diminished. A tincture of the seeds is also said to be an efficient preparation.

Medical Properties and Uses.—Magnolia is an aromatic bitter tonic. If administered freely it may induce diaphoresis and thus be useful in febrile affections. It is said to exert an antiperiodic influence in intermittent and remittent fevers, and has long been a favorite domestic remedy for these diseases in regions where the bark is readily accessible. Even in full doses it produces none of the disagreeable cephalic effects of cinchona, and therefore is worthy of trial when from any reason the latter or its alkaloids cannot be borne. It has been used with asserted benefit in both acute and chronic rheumatism. In some forms of dyspepsia it is also commended.

LIRIODENDRON.

Liriodendron Tulipifera Linné.—*Tulip Tree.*

Description.—Calyx: sepals 3, oblong, obtuse, concave, spreading, petal-like, deciduous. Corolla: petals 6, in two rows, oblong, obtuse, concave at the base, 2 inches long, greenish-yellow marked with orange, slightly spreading, forming a bell-shaped flower. Stamens numerous, hypogynous, shorter than the petals, inserted upon a conical receptacle; anthers linear, opening outward. Pistils numerous, flat, long and narrow, imbricating and cohering together, forming an elongated cone. Fruit cone-shaped, made up of numerous imbricated, 1-celled, 2-seeded, indehiscent, samara-like seed-vessels, which are in form lanceolate, compressed, and at the base triangular and tumid. The entire mass of seed-vessels is coherent until maturity, when they fall from the stems in a body or separate from each other and fall singly.

A large tree, often attaining the height of 100 feet, with a diameter at the base of 4 or 5 feet. In very favorable circumstances it has been known to grow much larger, attaining a height of 140 feet, with a diameter of 8 or 9 feet. The trunk is nearly straight, the branches somewhat scattered, and, compared with the size of the tree, rather small below but larger toward the top. When growing in the forest the stem for thirty or forty feet is, in general, free of branches, but under other circumstances the lowest branches are much nearer the ground. The leaves are alternate, on long foot-stalks, and when fully grown are from 4 to 8 inches in length, by about the same in breadth, somewhat cordate at the base and more or less deeply 4-lobed, two of the lobes being at the base and two at the apex, the latter separated from each other by a broad and shallow notch, which gives the leaf the appearance of having been cut off. Above the leaves are smooth and shining, of a dark yellowish-green; underneath much lighter, and strongly veined. The flowers are 2 to 3 inches in diameter, beautifully tinted, resembling some varieties of the tulip, whence the common name, and, as they are produced in immense numbers, add greatly to the beauty of this majestic tree during the period of its inflorescence. The flowers appear, in the latitude of New York, about the first of June, when the tree is in full leaf.

Habitat.—From Canada to Florida and westward to Eastern Kansas, growing more luxuriantly in rich moist ground, though occurring not unfrequently in elevated and dry situations. Under the name of white wood it is extensively used in cabinet work, in the inner wood-work of houses, for carriage panels, etc. In some sections of the country it is known as *white poplar,* in others *yellow poplar;* both unfortunate appellations, since it in no way resembles the true poplars, but is, on the contrary, a tree *sui generis,* being the only species of its genus in the known world.

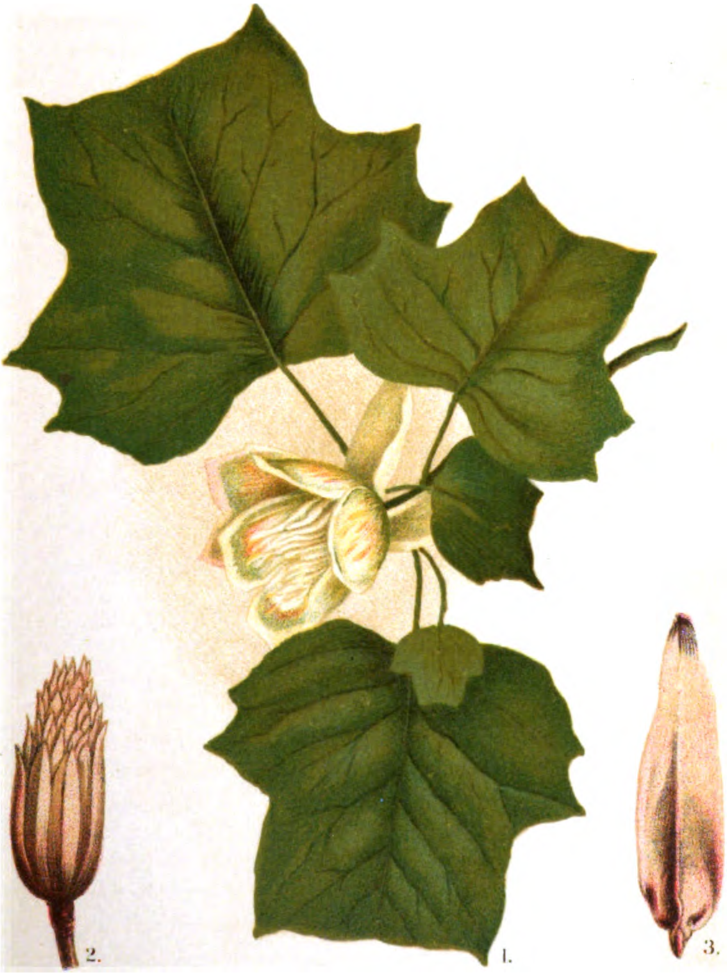
Part Used.—The bark, taken indiscriminately from the root, trunk, or branches—not official.

Constituents.—The bark of the tulip tree has a pungent, aromatic, bitter taste, and to analysis yields a crystalline principle, termed *liriodendrin,* having the same sensible properties. Whatever medicinal effects may be attributed to the drug are doubtless due to this principle. It may be obtained in a crystalline form from the alcoholic tincture, or as an amorphous powder from the infusion. It exists in greater proportion in the fresh bark than in that which has been long kept.

Preparations.—There are no official preparations, nor is the active principle prepared in commercial quantities. The drug may be administered in powder, or in the form of infusion or tincture. The earlier writers, from whom most of our knowledge of this subject comes, preferred to administer it in substance.

Medical Properties and Uses.—Like magnolia, the tulip tree possesses aromatic, bitter tonic properties. Some of the earlier writers upon American medicinal plants considered it nearly, if not altogether, as efficacious as cinchona in the treatment of intermittent fevers. It was, however, administered in combination with flowering dogwood (*Cornus florida*), probably a much more efficient drug. It has also been used as a stimulant diaphoretic in both acute and chronic rheumatism, and as a simple tonic in dyspeptic ailments, and in convalescence from acute dysentery and other acute diseases. At present it can scarcely be said to hold a place in scientific medicine, and even as a domestic remedy it is probably seldom employed.

PLATE II.



L. Johnson. Del.

LIRIODENDRON TULIPIFERA.

H. BENCKE, LITH. N.Y.

Plate II.—Liriodendron tulipifera.

FIG. 1.—Flowering branch, one-half natural size.

FIG. 2.—Mature fruit, one-half natural size.

FIG. 3.—Single seed-vessel, natural size.

MENISPERMACEÆ.

Character of the Order.—Shrubby climbing vines, with alternate, palmate, or peltate leaves, on slender petioles, without stipules; flowers small, diœcious or polygamous, in axillary racemes or panicles; sepals and petals similar, in three or more rows, imbricated in the bud; stamens 6 or more, hypogynous; ovaries 3 to 6; fruit a 1-seeded drupe with a long curved embryo in scanty albumen.

An order comprising about sixty genera, mostly tropical, three only, and of each but a single species, being natives of the United States. Of exotic species, Calumba (*Jateorrhiza calumba* Miers), Pareira (*Chondodendron tomentosum* Ruiz et Pavon), and Cocculus Indicus (*Anamirta paniculata* Colebrooke) are among the best known and most important.

MENISPERMUM.—MOONSEED.

Menispermum Canadense Linné.—*Canadian Moonseed.*

Description.—Calyx: sepals 4 to 8, ovate-oblong, greenish-yellow. Corolla: petals 6 to 8, much smaller than the sepals, orbicular, obtusely cuneate at the base. Stamens 12 to 20 in the sterile flowers, as long as the sepals; anthers of 4 spherical lobes. Pistils 2 to 4 in the fertile flowers, raised on a short common receptacle. Fruit a stipitate, globular drupe, about one-third of an inch in diameter, nearly black, the pulp small in quantity. After flowering the pistil in development becomes incurved, so that the mark of the stigma is near the base of the drupe, and the stone, laterally compressed, forms an almost complete ring, or is lunate, whence the common name.

Stem shrubby at the base, or entirely herbaceous, 8 to 15 feet or more in length, slender, springing from a long and freely rooted rhizome. Leaves 3 to 4 inches in length and of somewhat greater breadth, peltate near the edge, 3- to 7-angled or lobed, pubescent on the veins, dark green above, glaucous beneath; petioles about as long as the leaves. The flowers appear in June and July; the fruit ripens in September, is covered with a bloom, and resembles small clusters of frost grapes. In addition to its common name of moonseed, it also bears that of *yellow sarsaparilla,* and *yellow parilla,* the latter evidently a contraction of the former. At one time it was introduced into commerce as Texas sarsaparilla, and was employed to some extent as a substitute for true sarsaparilla (*Smilax officinalis*).

Habitat.—In moist woods and along the banks of streams, from Canada to the Carolinas and westward; common.

Parts Used.—The rhizome and rootlets—*United States Pharmacopœia.*

Constituents.—In an analysis of moonseed made by Professor Maisch there was found a small quantity of berberina, and a larger proportion of a white alkaloid, soluble in ether and alcohol, and sparingly in water. Its other constituents were not determined, but are probably unimportant.

Preparations.—There are no official preparations of moonseed. It yields its virtues to water and alcohol, and may be administered in decoction or tincture.

Medical Properties and Uses.—Moonseed is said to be tonic, alterative, and diuretic. If these reputed properties depend to any considerable extent upon the berberina present in the drug, they must, of necessity, be of a feeble character, since the proportion of this alkaloid is small. The therapeutic activity of the white alkaloid has not been demonstrated. As stated above, moonseed was at one time employed as a substitute for sarsaparilla, to which it was, by some observers, pronounced superior as an alterative. Inasmuch, however, as the medicinal virtues of sarsaparilla itself are of a rather doubtful character, this recommendation of moonseed is not particularly convincing. It is probable that the plant, by virtue of its bitterness, which it shares with calumba and other species of the menispermaceæ, and which is due, at least in part, to berberina, possesses feeble tonic powers, and that whatever effects it may cause, or seem to cause, are due merely to its tonic action. Taking this view of the subject, one can readily see how it might occasionally be beneficial in scrofulous, cutaneous, arthritic, rheumatic, syphilitic, and mercurial diseases, for all of which it has been recommended.

BERBERIDACEÆ.

Character of the Order.—Shrubs or herbaceous perennials with alternate or radical, compound, often spiny leaves; sepals and petals in two or more rows of 2 to 4 each, imbricated in the bud, deciduous; stamens as many as the petals, and opposite them, hypogynous; anthers 2-celled, opening upward by valves hinged at the top; ovary solitary, 1-celled; fruit a berry or capsule, 1- or many-seeded.

Podophyllum and Jeffersonia differ in some respects from the general structure of the order, both being many-seeded, the former having more stamens than petals and the latter having the sepals in one row.

The order comprises about a dozen genera and more than one hundred species. Seven genera are represented in the United States, and four of these comprise species of medicinal value. In general they possess acrid and bitter properties.

BERBERIS.—BARBERRY.

Character of the Genus.—Sepals 6, orbicular, with 2 to 6 bractlets outside. Petals 6, obovate, concave, shorter than the sepals, with two glandular spots inside above the short claws. Stamens 6, irritable. Style short; stigma circular, depressed. Fruit a 1- to 9-seeded berry; seeds erect, with a crustaceous integument.

Shrubs with yellow inner bark and wood, bristly serrate, often spiny 1- to 9-foliate leaves. Yellow flowers in drooping racemes, and acid fruit.

Berberis vulgaris Linné.—*Common Barberry.*

Description.—Flower and fruit as in the generic description above. Leaves on the young shoots mostly reduced to sharp triple or branched spines; on older branches they are produced in clusters or rosettes, and are ovate-oblong, with sharp bristly teeth. The flowers, in long drooping racemes, are produced from the axils of these leaves. The berries are oblong, 2-seeded, scarlet, and possess a gratefully acid and somewhat astringent taste.

A shrub, 4 to 8 feet in height, diffusely branched at the top, with a whitish or light gray, shining bark on the young shoots, and a much darker gray on the old stems. Flowers in May and June and matures its fruit in autumn.

Habitat.—Common barberry is a native of Europe, but has become naturalized and grows wild in some sections of New England. It is common in cultivation all over the country as an ornamental shrub.

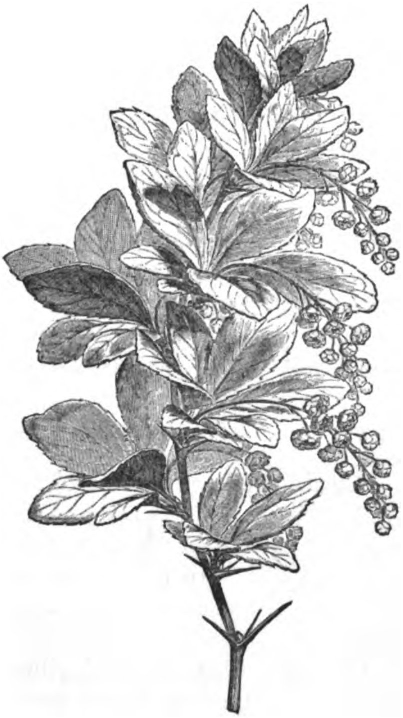


FIG. 101.—Berberis vulgaris.

Berberis Canadensis Pursh.—*American Barberry.*

Description.—Flowers and fruit as in the generic description above. Petals notched at the apex. Leaves repandly toothed, and less bristly pointed than in preceding species. Racemes fewer flowered. Berries oval.

A shrub from 1 to 3 feet in height. Formerly considered by many botanists a mere variety of *B. vulgaris.* Flowers in May and June.

Habitat.—Mountainous regions from Virginia to Georgia.

Berberis Aquifolium Pursh.—*Holly-leaved Barberry.*

Description.—Calyx: sepals suborbicular, membranaceous. Corolla: petals connivent, the innermost bifid at the apex. Berries dark purple.

A shrub from 2 to 5 feet in height, with evergreen, pinnate leaves; leaflets in 3 to 6 pairs, with an odd terminal one, coriaceous, ovate-lanceolate or elliptical-oblong, inequilateral or slightly cordate at the base, repand with thorny or spiny teeth, resembling those of holly, whence the specific name.

Habitat.—Western coast of North America, from Oregon southward.

Parts Used.—The bark of the stem and root, and the berries—not official.

Constituents.—The most important constituent of barberry is undoubtedly berberina, which, however, is present in only small proportion—much smaller than in hydrastis. Another principle, oxycanthin, sometimes called *berberia*, is present, also in small proportion. This is a white alkaloid, soluble in ether, alcohol, and chloroform, nearly insoluble in water, and has a bitter taste. The other constituents of the bark are unimportant. The berries are pleasantly acid, but have no constituents of special value.

Preparations.—There are no official preparations. The bark yields its virtues to alchol and water, and may be administered in tincture or infusion.

Medical Properties and Uses.—Whatever therapeutic effect may be produced by barberry is undoubtedly due to its most active principle, berberina. As this is present in but small proportion, the bark cannot be a very active agent. The European species, *B. vulgaris*, has been used to some extent as a tonic, chiefly in domestic practice. The American species have also been experimented with, but are not much esteemed. The berries are sometimes used to prepare a cooling and refreshing drink in fevers, etc.

CAULOPHYLLUM.—BLUE COHOSH.

Caulophyllum thalictroides Michaux.—*Blue Cohosh.*

Description.—Calyx: sepals 6, ovate-oblong, greenish-yellow, with 3 small bracts at their base. Corolla: petals 6, reniform or hooded, thick and gland-like, with short claws, much shorter than the sepals, and opposite them. Stamens 6, hypogynous, opposite the petals, with short, thick filaments; anthers ovate or oblong, opening upward by two valves hinged at the top. Pistil solitary, gibbous; style short; stigma minute and unilateral. The ovary bursts soon after flowering by the development of the seeds, which are thus left naked on their thick stalks, and, having a blue, fleshy integument, they look like drupes.

An herbaceous perennial, with a nearly horizontal, somewhat branched and knotty rhizome, from which springs a simple smooth and glaucous stem, 1 to 2½ feet in height, bearing at its summit a small raceme or panicle of greenish-yellow flowers, and a little below a large, sessile, triternately compound leaf. Leaflets 1 to 2½ inches long, about half as broad, obovate wedge-shaped, 2- to 3-lobed, the lateral ones sessile, the terminal petiolulate. A smaller triternate leaf is sometimes situated at the base of the panicle.

The flowers appear in April or May, while the leaf is yet small; the fruit matures in August. The plant is known in various sections of the country as *Pappoose Root*, *Squaw Root*, and *Blueberry Root.*

Habitat.—In rich, moist woods from Canada to South Carolina and westward. A very common plant, and quite widely distributed.

Parts Used.—The rhizome and rootlets—*United States Pharmacopœia.*

Constituents.—In addition to the ordinary constituents of plants, such as albumen, gum, starch, mineral salts, etc., there have been found in caulophyllum two resins, and a principle analogous to saponin. The resins, in an impure condition, are obtained by precipitation from the concentrated alcoholic tincture with water. The precipitate, which amounts to twelve per cent. of the root employed, is known as *caulophyllin.* It has a sweetish-bitter and afterward somewhat acrid taste, similar to that of the root, and probably represents whatever activity the plant is possessed of.

Preparations.—There are no official preparations of caulophyllum. As the root yields its virtues to alcohol, it may be administered in tincture, or in the form of the so-called caulophyllin, a commercial article readily obtainable.

Medical Properties and Uses.—Antispasmodic, demulcent, diaphoretic, diuretic, emmenagogue, and parturient properties have been attributed to this plant, but upon what evidence it is difficult to decide. Rafinesque says that "as a powerful emmenagogue it promotes delivery, menstruation, and dropsical discharges," and that it was used "by the Indians and their imitators for rheumatism, dropsy, colic, sore throat, cramp, hiccough, epilepsy, hysterics, inflammation of the uterus, etc." It would seem that many authors, in writing upon this plant since the time of Rafinesque, have repeated his assertions in one form or another, not only without question but generally without credit also. At any rate, little seems to have been added to, while much has been subtracted from, the estimated value of the plant as a remedy since Rafinesque's time. King, however, says (*American Dispensatory*): "In decoction, blue cohosh is preferable to ergot for expediting delivery in all those cases where the delay is owing to debility or want of uterine nervous energy, or is the result of fatigue." This statement will be taken *cum grano salis* by those who, like the author, have made an experimental comparison—or rather contrast—of the two.

JEFFERSONIA.—TWIN-LEAF.

Jeffersonia diphylla Persoon.—*Twin-Leaf, Rheumatism Root.*

Description.—Calyx: sepals 4, petal-like, fugacious. Corolla: petals 8, oblong, flat. Stamens 8, shorter than the petals; anthers linear-oblong, on slender filaments. Ovary solitary, ovoid, soon becoming gibbous; stigma 2-lobed, nearly sessile; ovules 5 or 6, attached to one side of the ovary below the middle. Fruit a somewhat stipitate capsule, opening by a transverse, semi-lunar slit near the summit. Seeds numerous, crowded in several rows on a lateral placenta, with a fleshy lacerate aril on one side.

An herbaceous perennial, with a thick, somewhat fleshy, horizontal, fibrous-rooted rhizome, from which arises a simple 1-flowered scape, and a tuft of long-petioled, bifoliate, or deeply 2-parted radical leaves, with oblong, foliaceous sheaths at their base. Leaves glaucous beneath; lamina parted into 2 semi-ovate segments, appearing like a pair of leaves (whence the name twin-leaf), each 3 to 4 inches long, nearly 2 inches wide, obscurely toothed or sinuate. Flowers white, about 1 inch in diameter, appearing in April or May. The fruit matures in July.

Habitat.—In rich, shady woods, on limestone soils, from New York to Tennessee. Not very common.

Parts Used.—The rhizome and rootlets—not official.

Constituents.—In addition to the common plant constituents, one analyst has discovered in Jeffersonia a bitter principle and an acrid acid analogous to that existing in *Polygala Senega*, termed polygalic acid, having the acrid and nauseous taste of the root, and capable of producing persistent nausea and vomiting. Another analyst found a small quantity of berberina and a larger proportion of a white alkaloid.

Preparations.—There are neither official nor commercial preparations of this plant. Its virtues are yielded to boiling water, and it may therefore be administered in decoction or infusion.

Medical Properties and Uses.—Jeffersonia is said to be alterative, antispasmodic, diuretic, diaphoretic, and expectorant. That it may possibly produce an alterative effect through the tonic influence of its alkaloid berberina is not unlikely, but the other effects attributed to it are probably largely due to its mode of administration rather than to its specific properties. Being rather nauseous, large quantities of it in decoction might readily induce antispasmodic, diaphoretic, or expectorant effects. It has been used as a substitute for senega, to which it bears some analogy as shown by analysis, and in chronic rheumatism, secondary syphilis, nervous affections, etc., chiefly in domestic practice. Rafinesque thought it worthy of investigation.

PODOPHYLLUM.—MAY-APPLE.

Podophyllum peltatum Linné.—*May-Apple, Mandrake.*

Description.—Calyx: sepals 6, unequal, obtuse, imbricate, pale green, caducous, with 3 small, fugacious bractlets at their base. Corolla: petals 6 to 9, obovate, twice the length of the sepals, white. Stamens 12 to 18, twice the number of the petals, hypogynous, with short, slender filaments; anthers linear-oblong, about the length of the filaments, 2-celled, opening longitudinally, and not upward by valves as is the rule with the order. Ovary ovoid, 1-celled, with many ovules; stigma sessile, large, thick, and undulate or lobed. Fruit a succulent berry as large as a medium-sized plum, smooth, yellowish-green when ripe, of a mildly acid taste and, to many people, an agreeable flavor. Seeds 12 or more, covering the large lateral placenta, in several rows, each seed enclosed in a pulpy aril, the whole forming a soft mass which fills the cavity of the fruit.

An herbaceous perennial having a creeping, fibrous-rooted rhizome, 1 to 6 feet in length, from which arise in early spring both flowering and flowerless stems about 1 foot in height. The flowerless stem is terminated by a single, large, round, 7- to 9-lobed leaf, centrally peltate, the lobes oblong, wedge-shaped, somewhat toothed or lobed at the apex. The flowering stem bifurcates 6 to 8 inches above the ground, and each branch bears at its summit, about 4 inches above the bifurcation, a single one-sided leaf, the stalk fixed near the inner edge, lobed and toothed in a manner similar to the leaves of the barren stems. At the bifurcation is situated a single white flower about 2 inches in diameter, upon a short, curved peduncle.

The plant blossoms in May and ripens its fruit in August and September.

Habitat.—This is a very common plant in rich, moist soil along the borders of woods and streams from Canada to Florida. Its beautiful foliage, and still more beautiful flowers, render it an object of interest entirely apart from its medicinal importance. It is, moreover, very hardy, and flourishes along the fences of cultivated fields long after many of its more tender natural associates have been exterminated. In view of its medicinal importance this is indeed gratifying, since it is a fact that many of our valuable indigenous medicinal plants will soon be completely eradicated by the progress of the very civilization which has recognized and utilized their virtues. Their natural habitat is the virgin soil of the unbroken forest, and once this is turned by the plow they disappear forever.

Parts Used.—The rhizome and rootlets—*United States Pharmacopœia.* The leaves partake of the properties of the root, but are not employed. The fruit, on the contrary, is entirely innocuous, and may be eaten, in any reasonable quantity, with impunity.

Constituents.—Podophyllum has a bitter, acrid taste, somewhat similar to that of other plants of the order. Its active properties reside in a resinous substance which is obtained by precipitation from a concentrated alcoholic tincture by means of water acidulated with hydrochloric acid. This has long been used and sold under the incorrect name *podophyllin.* It consists of two resins, one soluble in both ether and alcohol, the other in alcohol only, and is a mixture of the active and some of the inert principles of the root. The ultimate composition of these resins is still a matter of dispute among analysts. In addition to the resin, there also exist in the root the ordinary vegetable principles, but, as demonstrated by Professor Maisch and others, neither berberina nor any other alkaloid.

Preparations.—Abstractum podophylli—abstract of podophyllum; extractum podophylli—extract of podophyllum; extractum podophylli fluidum—fluid extract of podophyllum; resina podophylli—resin of podophyllum (incorrectly termed *podophyllin*).—*United States Pharmacopœia.*

Medical Properties and Uses.—Podophyllum is an active cathartic, increasing the intestinal secretions and producing copious and somewhat watery stools, resembling jalap in its mode of operation, though its effects are produced much more slowly. Its action is attended with considerable griping, and sometimes nausea, which, however, may be, to a great extent, obviated by administering it in combination with other cathartics or with sedatives. In over-doses it produces violent emeto-catharsis, and has not unfrequently caused fatal prostration. That it exerts a special influence upon the functions of the liver seems to have been abundantly demonstrated by clinical experience; and in those cases of inactivity of this organ so frequently met with in the condition vaguely but expressively termed "biliousness," few remedies act as satisfactorily. As an aid to overcoming the habit of constipation, administered alone or in judicious combinations, few drugs equal and fewer still surpass it in efficacy. Thus, though analogous to jalap in some respects, it has a wider range of usefulness. It is used by eclectics as a substitute for mercury in the treatment of syphilis, and has even been denominated "vegetable calomel," on account of its supposed efficacy as an alterative. There is little reason, however, for supposing that it exerts any direct or specific effect upon syphilis, or that its alterative influence extends beyond the mere increasing the hepatic and intestinal secretions. It would, therefore, be extremely unwise to rely upon it to the exclusion of mercury and the iodides in the treatment of so grave a disease as syphilis.

NYMPHÆACEÆ.

Character of the Order.—Aquatic perennial herbs, with horizontal rhizomes and peltate or cordate fleshy leaves, either floating on the surface of the water or borne above it upon long petioles. Sepals usually 4, sometimes confounded with the numerous petals, and these often passing gradually into stamens; stamens indefinite in number, inserted in the torus above the petals, with petaloid filaments, and adnate, introrse anthers, opening by two longitudinal clefts; torus large and fleshy, surrounding the ovary, which is many-celled and many-ovuled, with radiating stigmas. Fruit many-celled, indihescent; seeds very numerous, borne on the sides or back of the cells, and not on the ventral suture.

An order comprising five genera in North America, namely, Brasenia, Cabomba, Nelumbium, Nuphar, and Nymphæa, and these are represented by only a few species, none of which are very important medicinally. They are generally astringent and somewhat demulcent. The plant described below, *Nymphœa odorata*, is the most important medicinally, though species of the genus nuphar possess similar properties but to a more limited extent.

NYMPHÆA.—WATER-LILY.

Nymphæa odorata Aiton.—*Sweet-scented Water-Lily.*

Description.—Calyx: sepals 4, green outside, white within, nearly free, withering but not falling away. Corolla: petals numerous, in many rows, gadually passing into stamens, imbricate, inserted upon the ovary. Stamens indefinite, inserted upon the ovary above the petals, the outer ones with dilated, petal-like filaments. Ovary 18- to 30-celled, the concave summit bearing at its centre a tubercle, from which the stigmas, equal in number with the cells, radiate like the spokes of a wheel, projecting and incurving at the margin, forming a scalloped border. Fruit depressed-globular, many-celled, many-seeded, covered with the bases of the decayed petals.

A perennial aquatic herb, having a rough, knotty rhizome as large as a man's arm, from which proceed flower- and leaf-stems, 1 to 6 feet in length, varying in this respect according to the depth of water in which the specimen grows. Leaves orbicular, cordate-cleft to the base of the petiole, which is inserted about the centre, 6 to 10 inches wide, the margin entire, the upper surface dark, glossy green, repelling water, the under lighter green tinged with crimson or purple; petioles in section nearly semicircular, very flexible, porous, the pores filled with air to buoy the leaves up and permit them to float easily upon the surface of the water. Flower-stems round, otherwise resembling the petioles, retracting after flowering, so that the fruit matures under water. Flowers solitary, 3 to 5½ inches in diameter, white, rarely pink or rose-colored, very sweet scented, opening early in the morning and closing in the afternoon for several days in succession. The season of flowering extends throughout the summer, from June to September.

Habitat.—The margins of lakes, ponds, and slow-flowing streams with muddy bottoms from Canada to the Gulf of Mexico, often covering the surface of the water for acres in extent, and presenting a scene of rare loveliness. Indeed, there is only one other aquatic plant indigenous to North America (*Nelumbium luteum—Water Chinquepin*) at all comparable to this in beauty. The latter belongs to the same order and grows in similar situations, but is rare and local east of the Alleghanies.

Part Used.—The rhizome—not official.

Constituents.—The rhizome of the water-lily has an extremely astringent and bitter taste, the astringency being due to the presence of tannic and gallic acids, which are its only medicinal constituents.

Preparations.—There are neither official nor commercial preparations; and even the rhizome itself is seldom kept by the apothecaries.

Medical Properties and Uses.—Records of the employment of this plant are extremely meagre in medical literature. It has been used as an astringent in dysentery, diarrhœa, and catarrhal affections, in the last-named cases both internally and locally. It has also been employed topically as a discutient, and as an astringent poultice to suppurating ulcers. As it depends for its efficacy upon the tannic and gallic acids which it contains, it is hardly worthy of consideration when a choice of remedies is to be made.

SARRACENIACEÆ.

Character of the Order.—Perennial bog or marsh plants, with hollow, pitcher-like, or trumpet-shaped radical leaves and hypogynous, polyandrous flowers.

A small and unimportant though curious order of plants, comprising but three genera, of which two, Sarracenia and Darlingtonia, are indigenous to North America.

SARRACENIA.—Pitcher-Plant.

Character of the Genus.—Sepals 5, with 3 bractlets at their base, colored, persistent. Petals 5, oblong or obovate, incurved upon the ovary, colored, deciduous. Both sepals and petals are imbricate in æstivation. Stamens indefinite in number, hypogynous; anthers oblong, adnate, 2-celled, bursting internally and longitudinally. Ovary solitary, 5-celled, many-ovuled; style short, expanded at its summit into a large, 5-angled, umbrella-shaped lamina, with a small, incurved stigma at each angle. Capsule, crowned by the persistent style, 5-celled, each cell opening by a loculicidal valve. Seeds very numerous, minute, attached to 5 placentæ which project from the axis into the cavity of the cells.

Perennial herbs, with short, fibrous-rooted rhizomes, radical, hollow, pitcher-like, or trumpet-shaped leaves, and naked scapes, bearing each a single nodding flower.

Sarracenia purpurea Linné.—*Pitcher-Plant, Side-saddle Flower.*

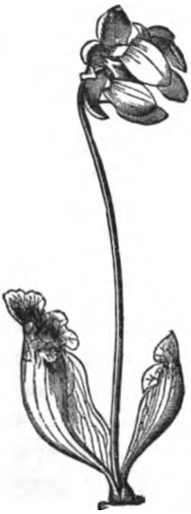


FIG. 102.—Sarracenia purpurea.

Description.—Calyx: sepals 1 inch long, half as wide, brownish-red or purplish externally, greenish within. Corolla: petals longer and narrower than the sepals, contracted toward, dilated at, the base, lighter in color externally than the sepals, still lighter within, folding inward, and nearly concealing the expanded style. Stamens numerous, completely covered by the style, which is 1 inch or more wide, light grayish-green; angles emarginate, the small, hooked stigmas projecting downward from the angles of the notches. Scape simple, smooth, about 1 foot high, surrounded at its base by a cluster of about half a dozen leaves, which are pitcher-like in form, upon short clasping petioles, dilated above, and terminated by an erect, round, heart-shaped hood, lined with stiff bristly hairs, pointing downward. The openings of the leaves are directed upward in such manner as to collect rain-drops, and their cavities are generally about full of water. A fully developed leaf will contain a half ounce or more of liquid. Owing to the downward direction of the hairs lining the mouths of the pitchers, insects falling into them are unable to get out, and it has been contended by some that the plant derives a part of its nourishment by a sort of digestion of insects thus captured and drowned. The flowers are produced in June.

Habitat.—In cold bogs and marshes, from Hudson's Bay to Florida. Quite common about the margins of ponds in tamarack swamps.

Sarracenia flava Linné.—*Trumpet-leaf, Watches.*

Description.—Leaves erect, 2 to 3 feet long, trumpet-shaped, narrowly winged; lamina 3 to 4 inches wide, yellow, erect, orbicular, slender-pointed, tomentose within, reddish at the base, or reticulated with purple veins. Scapes as long as the leaves. Flowers 4 to 5 inches wide, yellow, appearing in April and May.—Chupman.

Sarracenia variolaris Michaux.—*Spotted Trumpet-Leaf.*

Description.—Leaves erect, trumpet-shaped, broadly winged, spotted with white near the yellowish summit; lamina ovate, concave, arching over the orifice of the tube, hairy and reticulated with purple veins within. Flowers 2 inches wide, yellow, on scapes shorter than the leaves, appearing in May.—Chupman.

Habitat.—The two species of yellow-flowered sarracenia grow in low, wet pine barrens, from North Carolina to Florida and westward.

Parts Used.—The rhizome and rootlets—not official.

Constituents.—Analyses of these plants by different chemists have yielded different results. Professor U. C. Shepard found "an acid or an acid salt, and also an astringent property, due neither to tannic nor gallic acid, and a salt of some alkaloid, related perhaps to cinchonia, which, should it prove new, may be called sarracenin" (Porcher). Stan. Martin obtained a bitter alkaloid, *sarracenina*, whose sulphate is crystallizable, and F. Schmidt isolated an acid yellow coloring matter, *sarracenic acid*. So far as ascertained, the proximate principles obtained by analysis have not been subjected to therapeutic experimentation.

Preparations.—There are neither official nor commercial preparations. The powdered root may be administered in substance, or a tincture or infusion may be employed.

Medical Properties and Uses.—According to Dr. Porcher, sarracenia is used to a considerable extent in the Southern States as a bitter tonic and stomachic in dyspeptic affections. In over-doses it produced in his own person some cerebral disturbance, which he attributed to the presence of a narcotic principle. And to this narcotic principle he attributed also some of the relief obtained by use of the plant in painful indigestion.

PAPAVERACEÆ.

Character of the Order.—Annual or perennial herbs, with a thick colored or milky juice, regular flowers, the parts in twos or fours, numerous hypogynous stamens, and a 1-celled ovary, with 2 or more parietal placentæ. Sepals usually 2, rarely 3, falling when the bud opens. Petals 4 to 12, rarely more, spreading, commonly crumpled in the bud, and of short duration. Fruit a dry capsule or pod, containing numerous small, oily seeds. Leaves alternate, without stipules; commonly covered with a bloom. Peduncles generally 1-flowered.

A family of plants represented in the United States by about a dozen genera, comprising altogether a not much greater number of species, of which but two are of any medicinal importance. Indeed, the entire order as distributed over the globe is, with a few notable exceptions—chiefly papaver and sanguinaria—comparatively unimportant, either medicinally or economically. They generally possess acrid and more or less narcotic properties.

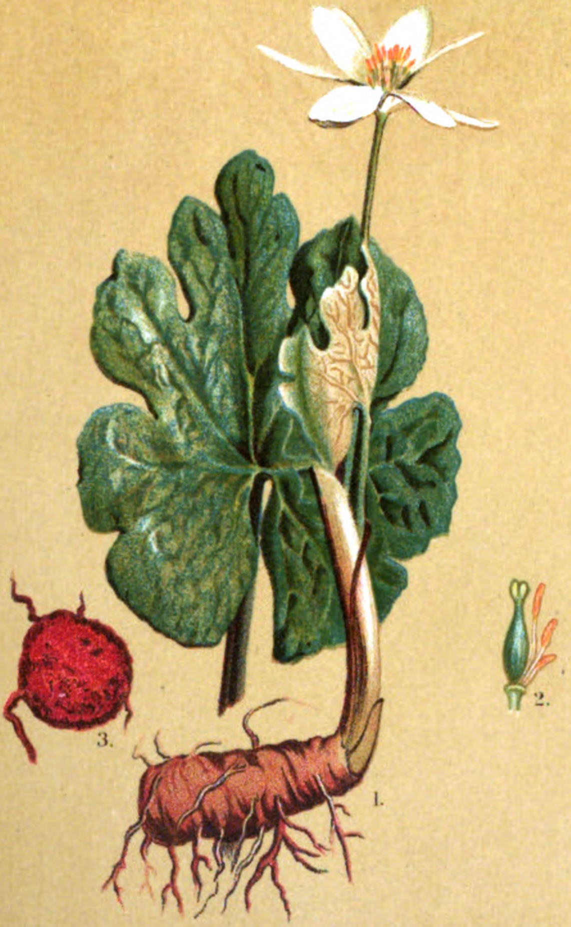
SANGUINARIA.—BLOODROOT.

Sanguinaria Canadensis Linné.—*Bloodroot.*

Description.—Calyx: sepals 2, light green, falling as the bud opens. Corolla: petals 8 to 12 or more, one-half to 1 inch long, oblong-spatulate, spreading, white or slightly rose-tinted, increasing in size for two or three days after the bud opens, and then falling away. Stamens about 24, in several rows, much shorter than the petals, those in the inner rows longest; anthers narrow, opening longitudinally. Ovary linear-oblong, 1-celled; style short, stigma 2-grooved. Capsule oblong, pointed at both ends, tipped with the style, 1-celled, 2-valved. Seeds numerous, roundish, smooth, with a prominent ridge along the raphe.

An herbaceous perennial, having a thick, fleshy, fibrous-rooted rhizome, 1 to 3 inches long, from which are sent up in early spring one or more simple, round scapes, each bearing a single flower, which expands in advance of the unfolding of the leaf enclosing it as it emerges from the ground. The leaves, all radical, are, when first unfolded, about 7-lobed, but become, later in the season, broadly reniform, and attain a breadth of 6 to 7 inches. They are borne upon long channelled petioles, are dark shining green above, grayish-green and strongly reticulated beneath. The rhizome is reddish-brown externally, paler within, and pours out, when wounded, an abundance of reddish orange-colored juice, whence the common name of the

PLAT



L. Johnson. Del.

SANGUINARIA CANADENSIS.

H. BENCK

Plate III.—Sanguinaria Canadensis.

Fig. 1.—Flowering plant, half natural size.

Fig. 2.—Pistil and stamens, natural size.

Fig. 3.—Cross-section of rhizome, natural size.

plant. Nor is the colored juice characteristic of the root only; it occurs in the leaves and flowers as well.

Habitat.—In rich, open woods from Canada to Florida and westward to the Mississippi. Formerly very common, it is becoming rapidly scarcer, and in the cultivated parts of the Atlantic States will ere long be considered comparatively rare. In the latitude of New York it blooms about the middle of April, and, like many of our early blooming plants, is of short duration. In favorable localities the first blossoms are quickly succeeded by myriads, so that the ground is almost white with them, presenting a most charming aspect.

Part Used.—The rhizome—*United States Pharmacopœia.*

Constituents.—Sanguinaria has a bitter, acrid taste, which persists for some time, accompanied by a sensation of constriction and irritation in the throat. This is most evident in the fresh rhizome, but does not disappear from the dried drug, which in powder is extremely irritating to the respiratory tract if inhaled. These irritant properties appear to reside mainly in an alkaloid, *sanguinarina,* which possesses them to an intense degree. This, when pure, is in white verrucose or needle-shaped crystals, soluble in both alcohol and ether, and, with acids, forms salts of a bright red color. Two other alkaloids and a peculiar acid have also been found in the drug, but sanguinarina appears to be the chief medicinal, as it is the only commercial, constituent.

Preparations.—Acetum sanguinariæ—vinegar of sanguinaria; extractum sanguinariæ fluidum—fluid extract of sanguinaria; tinctura sanguinariæ—tincture of sanguinaria.—*United States Pharmacopœia.*

Medical Properties and Uses.—In very small doses sanguinaria exerts a tonic influence, promoting gastro-intestinal secretion and thus aiding digestion. It is sometimes employed in this manner in dyspepsia, with asserted benefit. It is not, however, as a tonic that it exerts its greatest influence, but as an expectorant in diseases of the respiratory organs. In these cases it is employed in much larger doses than when its tonic effects are desired. In still larger doses it is emetic, and both too powerful and violent to be employed with safety. In over-doses it produces excessive prostration, insensibility, irregularity and feebleness of the pulse, and even fatal collapse. The dry powder is sometimes used as a sternutatory in chronic nasal catarrh, and it was formerly employed as a topical application to ulcers to repress fungous granulations or to excite indolent sores to greater and more healthy activity.

That sanguinaria was formerly highly esteemed by the medical profession generally, will become evident to the reader of our past and even present literature; that it is comparatively little used here in the East now is none the less apparent and true. Whether this is to be attributed to a mere change in therapeutic fashions or to a preference for expectorants of a milder character, is not easy to decide. At any rate, sanguinaria appears to have followed antimony and squill into comparative and probably unmerited disuse.

CHELIDONIUM.—CELANDINE.

Chelidonium majus Linné.—*Celandine.*

Description.—Calyx: sepals 2, ovate, yellowish, caducous. Corolla: petals 4, sub-orbicular, contracted at the base, yellow, early deciduous. Stamens indefinite in number, hypogynous, shorter than the petals; anthers 2-lobed. Ovary elongated, cylindrical, slightly bent, composed of 2 carpels separated by an incomplete partition, many-ovuled; style very short, the 2-lobed stigma apparently sessile upon the ovary. Fruit a dry pod, linear, 2-valved, the valves opening from below upward, becoming detached and leaving the dissepiment persistent upon the stem.

An herbaceous perennial, with a fusiform root, erect, branching, somewhat hairy stems, 1 to 2 feet high, alternate, pinnately divided or bi-pinnatifid leaves, and small flowers in small pedunculate umbels at the summits of the branches. Leaflets 3 to 7, the lobes incised, crenate, petiolulate, or decurrent upon the common petiole, glabrous above, glaucous underneath. The flowers are produced throughout the summer. All parts of the plant are pervaded with an acrid, saffron-colored juice.

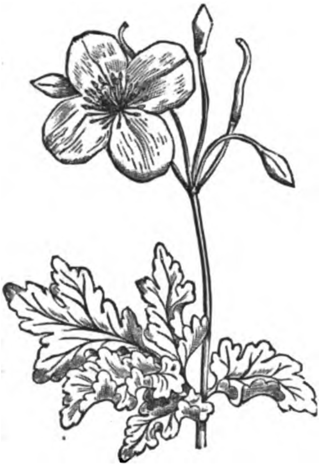


FIG. 103.—Chelidonium majus.

Habitat.—A native of Europe, celandine has become fully naturalized here, growing about old buildings and fences and along roadsides.

Part Used.—The entire plant—*United States Pharmacopœia.*

Constituents.—Celandine has a rather unpleasant odor, and a persistent, acrid, bitter taste, which is stronger in the root than in the leaves. The juice possesses the same sensible properties, though to a more intense degree. The odor is lost in drying, but the taste remains. An analysis of the plant by Probst yielded a peculiar acid, *chelidonic,* two alkaline principles, the one, *chelerythrine,* forming salts with acids, the other, *cheledonine,* uniting with acids without neutralizing them, and finally a neutral crystallizable, bitter principle termed *chelidoxanthin.* Chelerythrine is said to be an acrid narcotic poison, while cheledonine has been shown to be identical with *sanguinarine,* the most important constituent of bloodroot.

Preparations.—There are no official preparations. The expressed juice is very active, and affords a convenient mode of administration when obtainable. The dried root or herb may be administered in substance, decoction, or infusion, or a watery extract may be employed.

Medical Properties and Uses.—In medicinal doses celandine is diaphoretic, diuretic, expectorant, and purgative ; in over-doses it is an acrid narcotic poison, producing not only excessive purgation but great cerebral disturbance. It bears, therefore, a close analogy in its action to sanguinaria. In both, the acrid-properties are much more apparent than the narcotic, so that fatal effects may be produced before narcotic symptoms become very evident. In this respect they are in marked contrast with the poppy, a member of the same order of plants, whose stimulating properties are of secondary importance compared with its narcotic influence.

Celandine is a remedy which has come down to us from the fathers of medicine, and is interesting chiefly on account of its historical associations, for it is seldom employed at the present day. Its action, as outlined above, suffices to indicate the classes of cases to which it is applicable, but a catalogue of the diseases in which it has been employed would be formidable. As a drastic purgative it was formerly used in dropsy ; and it was especially esteemed in jaundice, an idea which, as Woodville remarks, probably had its origin in the absurd doctrine of signatures, though there can be little doubt that it might, through its stimulant properties, be of occasional benefit in this condition. The fresh juice has been used as a topical application to corns and warts and in the squamous stages of various skin diseases. It requires to be employed with caution, for it is extremely irritating.

FUMARIACEÆ.

Character of the Order.—Herbs with brittle stems, watery juice, alternate, dissected, exstipulate leaves, and irregular, unsymmetrical flowers. Sepals 2, deciduous. Petals 4, cruciate, irregular, one or two of them saccate or spurred, and the two inner ones often cohering at the apex so as to include the anthers and stigma. Stamens 6, in two sets of three each, placed opposite the larger petals, hypogynous, the filaments often united ; the middle anther of each set 2-celled, the outer ones 1-celled. Ovary 1-celled ; style filiform ; stigma with 2 or more points. Fruit a 1-celled pod, either 1-seeded and indehiscent or several-seeded with two parietal placentæ.

An unimportant though interesting order of plants, closely allied to the *papaveraceæ* in general structure, but having watery instead of milky juice. There are but three strictly North American genera, namely, Adlumia, Corydalis, and Dicentra. Fumaria, though flourishing here without cultivation, is not indigenous, but has been introduced from Europe.

DICENTRA.

Dicentra Canadensis De Candolle (*Corydalis formosa* Pursh).—*Squirrel Corn, Turkey Corn.*

Description.—Calyx: sepals 2, small and scale-like, deciduous. Corolla:

petals 4, slightly coherent, the two outer equally spurred, the spurs short, rounded, obtuse, slightly incurved, giving the whole a somewhat heart-shaped outline; inner petals with a projecting, conspicuous crest. Stamens in two sets, with filaments united. Stigmas 2-crested and somewhat 2-horned. Pod 10- to 20-seeded.

A low, smooth, stemless perennial, whose underground shoots bear small yellow tubers, resembling peas or kernels of Indian corn, whence the common names. Leaves all radical, 10 to 12 inches high, bi-ternate, the leaflets deeply pinnatifid, the lobes linear-oblong, sub-glaucous. Scape 6 to 10 inches high, simple, smooth. Flowers 4 to 10, nodding, fragrant, greenish-white tinged with rose-color, appearing in May and June.

Habitat.—In rich woods from Canada to Pennsylvania, Kentucky and westward; most common northward.

Part Used.—The rhizome—not official.

Constituents.—Dicentra has a faint, peculiar odor and a characteristic slightly bitter taste, which is quite persistent, and for some time greatly increases the flow of saliva. It has yielded to analysis an alkaloid termed *corydalin*, together with a peculiar acid, a volatile oil, a tasteless and an acrid resin, bitter extractive, and ordinary vegetable constituents. A commercial article, improperly termed *corydalin*, is considerably used by eclectic practitioners, and is said to fairly represent the medicinal constituents of the plant. It is prepared from the alcoholic tincture by precipitation, and is an impure resinous substance.

Preparations.—None are official. It may be administered in infusion, tincture, or extract, or in the form of the so-called corydalin.

Medical Properties and Uses.—Dicentra is said to be tonic, diuretic, and alterative. As a tonic King considers its action similar to gentian and colombo, or other pure bitters; and its alterative properties "in syphilis, especially in the constitutional form, when occurring in debilitated or broken-down constitutions . . . not equalled by any other agent." Not, however, because "it exerts any real influence as an antisyphilitic, properly so called," but simply in the office of an alterative tonic. Though the evidence in favor of its efficacy as a remedy must necessarily be collected chiefly from eclectic sources, there is enough of it to justify the conclusion that dicentra is not inert, but, on the contrary, is worthy of more careful examination than it has hitherto received.

FUMARIA.—FUMITORY.

Fumaria officinalis Linné.—*Common Fumitory.*

Description.—Calyx: sepals 2, ovate-lanceolate, acute, sharply toothed, shorter than the corolla, caducous. Corolla: petals 4, the upper one of the outer pair spurred at the base, the lateral pair cohering at their tips and forming a quadrangular mouth. Stamens 6, in two sets of three each.

Ovary oval; style filiform, about as long as the stamens, deciduous. Pod roundish, somewhat heart-shaped, 1-seeded, indehiscent.

A small, leafy, much-branched annual, about 1 foot high. Leaves bipinnate, the pinnulæ mostly 3-lobed, of a pale green color. Flowers small, reddish-purple, in dense spikes or racemes.

Habitat.—A native of Europe but naturalized here, growing in waste places about dwellings and in cultivated grounds.

Part Used.—The herb—not official.

Constituents.—Fumitory has a bitter, disagreeable taste, strongly marked in the fresh herb and still more so in the dried specimen. It has yielded to analysis a peculiar crystallizable acid, termed *fumaric acid,* and an alkaloid, also crystalline, termed *fumarine.* These are supposed to be the active constituents of the plant, but experiments in support of the supposition appear to be lacking.

Preparations.—None are official. The expressed juice of the fresh plant is an efficient preparation; the decoction and infusion are also eligible forms of administration.

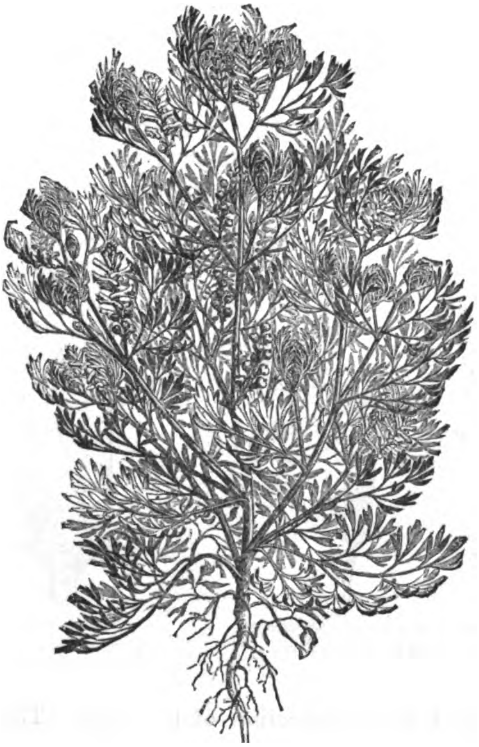


Fig. 104.—Fumaria officinalis.

Medical Properties and Uses.—Fumitory was highly esteemed by the ancients as a blood purifier, and was also believed to exert a special influence upon the eyes. In more recent times it has been regarded as tonic and depurative, and as being specially beneficial in diseases of the skin. At one time or another it has, therefore, been employed with asserted benefit in a great variety of cases. Cullen found it more beneficial in skin diseases than in any other class of cases. Others have used it in scrofulous and scorbutic affections; others as a vermifuge, though as Cazin remarks, it is no more anthelmintic than other bitters. It is sometimes employed externally in cutaneous affections, in the form of a decoction made by boiling the plant in milk.

CRUCIFERÆ.

Character of the Order.—Herbs with alternate, exstipulate leaves, cruciform flowers in terminal racemes or corymbs, and a pungent, acrid, watery juice. Sepals 4, deciduous. Petals 4, hypogynous, placed opposite each other in pairs, their limbs spreading and forming a cross. Stamens 6, four of equal length placed in pairs opposite each other, the remaining two, shorter, placed beneath them and opposite each other. Ovary of 2 united carpels, with 2 parietal placentæ, separated by a membranaceous partition; style short or absent, often persistent; stigmas 2, opposite the placentæ. Fruit a silique or silicle, usually 2-celled, rarely 1-celled, 1- to many-seeded, dehiscent by the separation of the valves from the persistent placentæ, or occasionally indehiscent, and either lomentaceous or nucumentaceous. Seeds campylotropous, generally pendulous, attached in a single row to each side of the placenta. Embryo with cotyledons variously folded on the radicle.

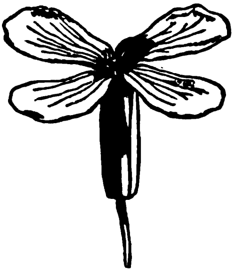


FIG. 105.—Form of flower common to the Cruciferæ.

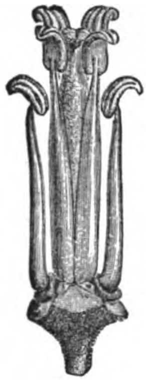


FIG. 106.—Arrangement of stamens common to the Cruciferæ.

This is a very natural and easily recognized family of plants, the cruciform flowers (Fig. 105) and peculiarly arranged stamens (Fig. 106) serving for immediate identification of the order. The identification of the genera is, however, quite another matter. Here the characters are taken from the pods and seeds, and in some instances are, to the beginner at least, very perplexing.

All the crucifers possess, to a greater or less extent, acrid and irritating properties, but none of them are positively poisonous. The acrid principle is usually of a volatile character, somewhat dissipated in drying and entirely so by boiling. Though generally present in all parts of the plant, it is often most concentrated in the seeds, and may be obtained from many of them by distillation in the form of a volatile oil. Whatever of medicinal importance the order may have is undoubtedly due to the acrid principle present, and this appears to act merely by virtue of its stimulant and irritant properties. Hence all statements attributing specific virtues to any plant of the order should be viewed with suspicion. There is no one order in the vegetable kingdom of more strongly marked characteristics, both of organic structure and chemical composition, than this; and hence to know a single plant of the family well—for example, mustard—is to know them all. Many of them—for instance, the cabbage and turnip—have been modified to a considerable extent by long cultivation, and have become valuable articles of food.

NASTURTIUM.

Character of the Genus.—Pod a silique or silicle, linear-oblong or globular, nearly or quite round. Seeds small, numerous, marginless, in two irregular rows in each cell. Cotyledons accumbent. Annual, biennial, or perennial herbs, aquatic or growing in marshes and wet places, with white or yellow flowers, and commonly smooth, shining, pinnate or pinnatifid leaves.

Nasturtium officinale Robert Brown.—*Water-cress.*

Description.—Calyx: sepals ovate, caducous. Corolla: petals white, twice the length of the sepals. Siliques one-half to two-thirds inch long, bending upward, more or less, on divergent, ascending pedicels, of nearly the same length. Root biennial, long, and creeping. Stem spreading and rooting. Leaves pinnate; leaflets 3 to 11, roundish or oblong, nearly entire, the terminal one largest.

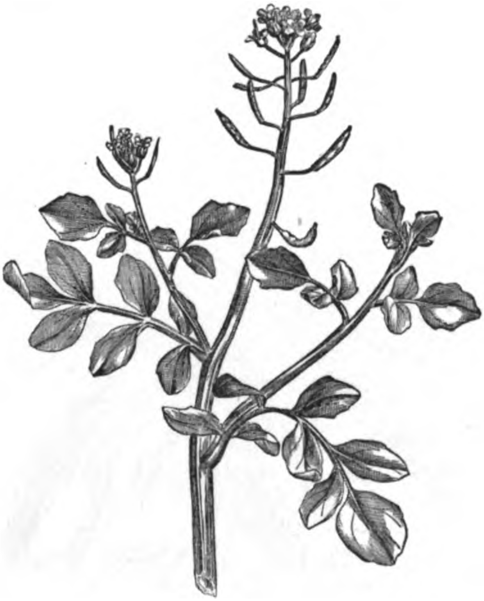


FIG. 107.—Nasturtium officinale.

Habitat.—Introduced from Europe, where it has long been cultivated as a salad. Escaping from cultivation here, it has become established in brooks and ditches.

Nasturtium Armoracia Fries (*Cochlearia Armoracia* Linné).—*Horse-radish.*

Description.—Calyx: sepals ovate, obtuse, caducous. Corolla: petals white, twice the length of the sepals. Style very short, persistent. Pod nearly globular, about 4-seeded, seldom attaining perfection here or in Britain. Root perennial, large, tapering, 6 to 12 inches long. Stem erect, 2 to 3 feet high. Radical leaves long and large, crenate, seldom pinnatifid: stem-leaves smaller and narrower than the radical, the lower ones often deeply toothed or pinnatifid, the upper lanceolate, sparsely toothed. Flowers small, in numerous racemes, forming a terminal panicle.

Habitat.—Introduced from Europe and cultivated chiefly as a condiment. Escaping from cultivation, it has become, to some extent, naturalized. It grows best in deep, rich, moist soil, and when once well established is difficult to eradicate.

Two strictly indigenous species of this genus, namely, *N. palustre* De Candolle—*Marsh-cress,* and *N. lacustre* Gray—*Lake-cress,* possess properties similar to those described above, but as they are seldom, if ever, employed, their description is omitted.

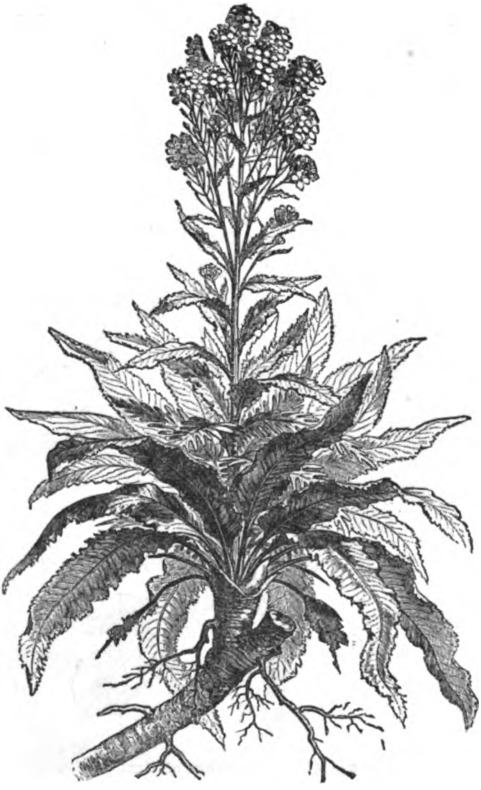


FIG. 108.—Nasturtium (cochlearia) Armoracia.

Parts Used.—Water-cress, the herb; horseradish, the leaves and root. Neither is official.

Constituents.—Water-cress distilled with water yields a volatile oil, probably identical with volatile oil of mustard; horseradish, treated in like manner, yields a similar oil, having the same chemical composition as volatile oil of mustard, but a slightly different odor. This oil does not pre-exist in the plant, but is formed during the process of distillation, as is the case with many other volatile oils. It is intensely acrid and irritating.

Preparations. — None are official. The expressed juice of water-cress has been administered. Horseradish is generally employed in infusion, though there is an official (*British Pharmacopœia*) preparation, *Spiritus armoraciæ compositus—compound spirit of horseradish.*

Medical Properties and Uses.—Water-cress, though used chiefly as a stimulating salad to sharpen the appetite and aid digestion, possesses mild antiscorbutic properties, and is used in domestic practice as a "blood purifier" in the spring of the year. It probably acts simply as a stimulant to the functions of digestion and assimilation. Externally it is sometimes employed as a counterirritant. Horseradish possesses properties similar to, but more intense than those of water-cress. It is chiefly used as a stimulating condiment. Externally the bruised root, or more frequently the leaves are used as a counterirritant.

The acrid principles of these plants appear, clinically, to be eliminated by the kidneys, and hence, incidentally, they produce a decided diuretic effect. The urine is not only increased in quantity, but partakes also of the acrid character of the plant employed. In one case that came under the author's observation the individual, though in perfect health so far as the genito-urinary tract was concerned, suffered extremely from vesical pain and irritation for hours after using horseradish as a condiment.

BRASSICA.—SINAPIS.

Character of the Genus.—Pod linear, cylindrical or nearly so, smooth or with stiff hairs, more or less beaked at the top, the beak consisting of the persistent style alone, or including a portion of the pod and a single seed. Seeds globose, in a single row; the cotyledons folded longitudinally over the radicle.

Annual or biennial herbs, smooth or bristly, the lower leaves generally deeply pinnate or lyrate, the upper sometimes entire. Flowers yellow, in axillary and terminal racemes.

No plants of this genus are indigenous to North America, but several foreign species have become naturalized, the most important of which are described below.

Brassica alba Boissier (*Sinapis alba* Linné).—*White Mustard.*

Description.—Flowers rather large, about one-half inch in diameter. Pods three-fourths to one inch long on divergent ascending pedicels, more than half the length occupied by the stout, flattened, often curved, 1-seeded beak; the valves and lower part of the beak covered with stiff, bristly hairs. Stem 1 to 2 feet high, smooth or with stiff hairs. Leaves pinnately lobed or divided, the lobes ovate or oblong, coarsely toothed, the terminal one largest.

Habitat.—Introduced from Europe and sparingly naturalized in cultivated grounds.

Brassica nigra Koch (*Sinapis nigra* Linné).—*Black Mustard.*

Description.—Flowers smaller than in white mustard. Pods about one-half inch long, on short, appressed pedicels, smooth, slightly conical at the base, the apex tipped with the short, persistent style. Stem 2 to 3 feet high, erect, freely branched. Lower leaves deeply divided, with one large ovate or oblong terminal lobe and smaller lateral ones; upper leaves often entire.

Habitat.—Introduced from Europe. Better established than white mustard.

Part Used.—The seed. Official name: Sinapis alba—white mustard; Sinapis nigra—black mustard.—*United States Pharmacopœia.*

Constituents.—The white mustard-seed is about one-twelfth of an inch in diameter, almost globular, and of a yellowish color; the black mustard-seed one twenty-fifth of an inch in diameter, similar shape, blackish-brown. Both yield a yellow powder, and both contain a considerable percentage of fixed oil, which is bland, inodorous, and non-drying. Their active irritating constituents are, however, though similar, far from identical, that of black mustard being a volatile oil, while that of white mustard cannot be obtained by distillation. In neither case does the acrid principle pre-exist in the seed, but is formed by chemical reaction or fermentation of existing principles when brought into contact with each other in the presence of water. The reaction differing so widely in results in the two cases is thus explained: Black mustard has as one of its constituents a crystallizable substance termed *sinnigrin*, which in the presence of another constituent, *myrosin*, an albuminous body, and water, is decomposed, yielding sugar, bisulphate of potassium, and the volatile oil of mustard. White mustard, on the other hand, though containing *myrosin*, has instead of *sinnigrin* a similar complex substance, termed *sinalbin*, which is decomposed by *myrosin* in the presence of water, yielding sugar, sulphate of sinapin, and sulphocyanate of acrinyl, the latter being the acrid principle.

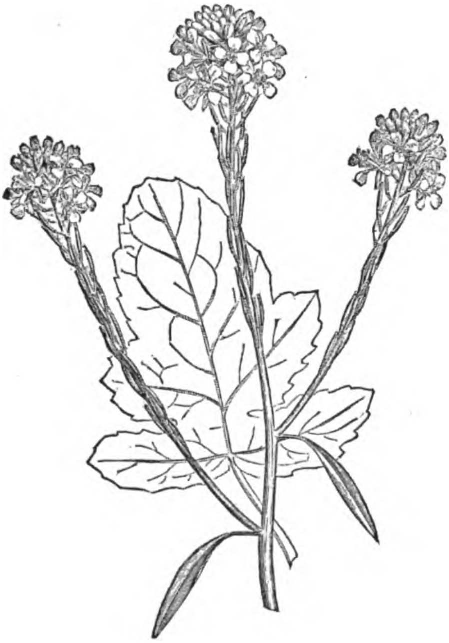


FIG. 109.—Brassica (sinapis) nigra.

Preparations.—Of white mustard, none; of black mustard, Charta sinapis—mustard paper.—*United States Pharmacopœia.*

Medical Properties and Uses.—These are too well known to require more than mere mention. As an aid to digestion it is used in every household. As a prompt and efficient emetic it is almost always at hand and the first to be employed in emergencies. As a rubefacient its sphere of usefulness is practically unlimited.

CAPSELLA.

Capsella Bursa-pastoris Moench (*Thlaspi Bursa-pastoris* Linné).—*Shepherd's Purse.*

Description.—Flowers small, white. Pods obcordate-triangular, flattened at right angles to the partition, wingless, each valve 10- to 12-seeded, in long, loose racemes. Cotyledons incumbent.

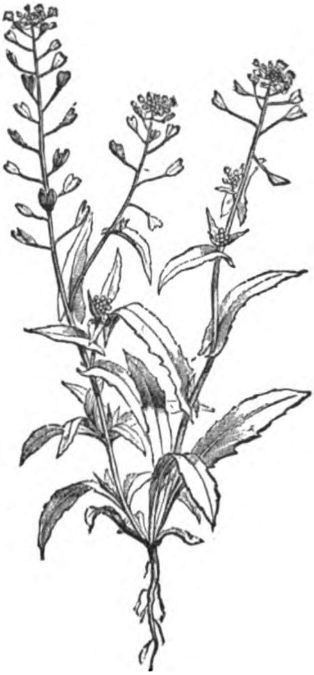


Fig. 110.—Capsella Bursa-pastoris.

A small annual, with an erect, hairy stem and a long, tapering root. Radical leaves clustered, pinnatifid or toothed, rarely entire; stem-leaves oblong or lanceolate, entire or toothed, clasping the stem with projecting auricles. It flowers from early spring until winter.

Habitat.—A native of Europe or Western Asia, it has followed man into almost every extra-tropical region and become one of the commonest weeds known.

Part Used.—The herb—not official.

Constituents. — Shepherd's purse has a pungent, bitter taste, and on distillation yields a volatile oil identical with oil of mustard.

Preparations.—There are none. The expressed juice or infusion may be employed.

Medical Properties and Uses.—This plant has been used as a tonic, astringent, and antiscorbutic. There is perhaps more testimony in support of its efficacy as an astringent in hemorrhages from the lungs, kidneys, bladder, uterus, etc., than for any other purpose, but even this testimony is incomplete and unsatisfactory. Once highly esteemed, it has fallen into entire—and probably merited—neglect.

VIOLACEÆ.

Character of the Order.—Perennial, rarely annual, herbs, with simple alternate or radical stipulate leaves and nodding flowers, either solitary or in cymes, racemes, or panicles. Calyx of 5 persistent sepals. Corolla somewhat irregular, 1-spurred, of five unequal petals, imbricated in the bud. Stamens 5, hypogynous, their filaments projecting beyond the anther cells and converging over the pistil. Ovary 1-celled, with 3 parietal placentæ; style club-shaped; stigma simple, turned to one side. Fruit a 3-valved, many-seeded capsule, the valves, after opening, folding longitudinally and projecting the seeds. Seeds comparatively large, anatropous; cotyledons flat.

An order of plants more remarkable for their beauty and fragrance—many of them lack the latter quality—than for any medicinal or economic properties. Represented in North America by two genera, namely, Ionidium (*Solea*) and Viola, the former comprising three and the latter about thirty species. Very few plants of the order have been experimented with therapeutically, and these have yielded no very important results.

VIOLA.—VIOLET.

Character of the Genus.—Sepals extended into auricles at the base, and appearing as though joined at their sides. Petals somewhat unequal, the lower one spurred at the base. Stamens closely embracing the ovary, slightly coherent, the two lower bearing spurs which project backward into the spurred petal.

In addition to the conspicuous colored flowers, several of the species bear, later in the season, other flowers, on short peduncles, which do not open but become fertilized in the bud, and develop their capsules at or near the surface of the ground; these are much more fruitful than the colored blossoms, and are both curious and interesting. Most of the species are stemless perennials.

Viola cucullata Aiton.—*Common Blue Violet.*

Description.—Calyx: sepals as in the character of the genus. Corolla: petals variable as to size and color, generally comparatively large, pale or deep violet-blue or purple, sometimes variegated or nearly white, the two lateral and often the lower one bearded; spur short and thick.

A stemless perennial. Rhizome thickly beset with fleshy teeth, branching and forming compact masses. Leaves upright on long petioles, cordate with a broad sinus, varying to reniform or triangular, smooth or pubescent, the bases rolled inward when young. Scapes simple, 3 to 10 inches high, 1-flowered, produced in profusion. Flowers inodorous or nearly so, appearing in April or May and continuing to be produced throughout the summer.

Habitat.—This most common and most variable species is abundant in wet places from the Arctic regions to the Gulf of Mexico.

Viola pedata Linné.—*Bird-Foot Violet.*

Description.—Calyx: sepals as in the preceding. Corolla: petals large, beardless, pale or deep lilac-purple, or blue.

A stemless perennial. Rhizome erect, short, thick, abrupt. Leaves all 3- to 5-divided, lateral divisions 2- to 3-parted, linear or spatulate, sometimes 2- to 3-toothed or cut at the apex. Flowers 1 inch broad, in masses fragrant, appearing in May and, occasionally, another crop later in the season.

Habitat.—In sandy soil; nearly as widely distributed as the preceding, but far less common.

Viola tricolor Linné.—*Pansy, Heart's ease.*

Description.—Calyx: sepals as in the preceding. Corolla: petals large, variegated with white, yellow, blue, purple, etc.

Annual, biennial, or short-lived perennial, with short rootstock and erect, angular, branching, leafy stem. Leaves narrowly oblong, ovate or cordate, obtuse, slightly crenate; stipules large, leaf-like, deeply divided into several linear or oblong lobes.

Habitat.—A native of Europe, the pansy has long been cultivated here as an ornamental plant, and is familiar to every one as a florist's flower. It has escaped from cultivation and become, to some extent, naturalized. Indeed, some authorities believe that a variety of the species is indigenous. When growing without cultivation it rapidly deteriorates in size but gains as regards its medicinal activity, and hence the uncultivated plant only is official.

Parts Used.—Of Viola tricolor, the herb.—*United States Pharmacopœia.* The other species are not official, though V. pedata was so at one time, the rhizome being employed.

Constituents.—Very little is known of the constituents of the species of violets here described. An allied species, *V. odorata,* of Europe, has yielded to analysis an alkaloid—*violin*—analogous to *emetin.*[1] All the species are mucilaginous and emollient, but beyond this, and the fact just stated regarding V. odorata, their constituents are yet to be investigated.

Preparations.—None are official. They are chiefly employed in decoction, though there is a commercial fluid extract of V. tricolor.

Medical Properties and Uses.—All species of the violet subjected to experiment appear to be emetic and cathartic when administered in considerable doses. Their nauseating properties probably depend upon the presence of violin; and to this and the mucilaginous property also existing is doubtless due their expectorant effect when administered in bronchial and pulmonary affections. At present, however, little use is made of them. The sweet violet of Europe is employed there in the preparation of a syrup, which is used chiefly as a vehicle on account of its beautiful color and agreeable odor.

Quite recently Dr. Piffard called attention to the value of viola tricolor as a remedy in *crusta lactea,* for which it was much used in Europe years ago. Owing to his recommendation of the plant many other physicians have subjected it to experiment, among them the writer, who, though less enthusiastic in his praise of it than Dr. Piffard, feels sure that it exerts a remedial influence upon this troublesome disease.

CISTACEÆ.

Character of the Order.—Shrubs or herbs, often viscid. Sepals 5, unequal, persistent, the outer two often small and bract-like, sometimes wanting; the inner three larger and somewhat twisted in the bud. Petals 5, equal, hypogynous, very fugitive, crumpled in the bud, and twisted in a direction opposite to that of the sepals. Stamens indefinite, distinct, hypogynous; filaments slender; anthers innate. Ovary distinct, 1- to many-celled, few- or many-ovuled, the ovules with a foramen at their apex; style single or none; stigma simple. Fruit a capsule, usually 3- or 5-valved, occasionally 10-valved, either 1-celled or imperfectly 5- to 10-celled.

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[1] See Rafinesque, vol. ii., p. 275.

Leaves simple, usually entire, the lower opposite, the upper alternate, stipulate or exstipulate.

A small and unimportant order, comprising in North America three genera, namely, Helianthemum, Hudsonia, and Lechea, the first-named only being represented by medicinal species.

HELIANTHEMUM.—ROCK ROSE.

Character of the Genus.—Sepals and petals as in the character of the order. Ovary 1-celled; style short or none. Most North American species bear two crops of flowers, of widely different aspect. The early flowers are few in number, solitary or in terminal corymbs, have large yellow petals, and produce many-seeded capsules, while the later ones are in axillary clusters, the petals small and inconspicuous or absent altogether, and the capsules few-seeded.

Helianthemum Canadense Michaux.—*Frostweed, Rock Rose.*

Description.—Calyx: sepals 5, the outer two small. Corolla: petals of the early flowers 5, large and showy, opening but once, in sunshine, and falling the next day. Expanded flower about 1 inch broad.

Stem erect, hairy, pubescent, 6 to 18 inches high, at first simple, ultimately branching. Leaves alternate, entire, lanceolate-oblong, pubescent, about 1 inch long. Early flowers solitary; secondary flowers in axillary clusters. Period of flowering, June to August.

Habitat.—In dry, sandy soil from Canada southward; common.

Helianthemum corymbosum Michaux.

Description.—Like the preceding, except that the flowers are in terminal corymbs, the showy ones becoming stalked, while the others are sessile, and the whole plant being more pubescent.

Habitat.—In pine barrens from New Jersey to Florida, along the coast.

Part Used.—The herb—not official.

Constituents.—The only constituent of therapeutic activity thus far discovered in these plants is tannin.

Preparations.—There are various commercial preparations.

Medical Properties and Uses.—Frostweed is a mild astringent, and probably nothing more, though it is not without advocates among those who appear to think every plant must, of necessity, possess therapeutic virtues. Of course such persons value it highly in scrofula, etc.

DROSERACEÆ.

Character of the Order.—Low, glandular-hairy herbs, with tufted radical leaves, and flowers in naked 1-sided racemes, growing in bogs and marshes. Sepals 5, equal, imbricate, persistent. Petals 5, hypogynous, withering. Stamens distinct, hypogynous, equal in number with the petals, and alternate with them, or two to four times as many. Ovary single, 1-celled, many-ovuled, with 3 or 5 parietal placentæ; styles 3 or 5, deeply bifid, appearing like 6 or 10. Capsule 3- or 5-valved, many-seeded.

An order represented in North America by two genera, namely Drosera and Dionæa, together comprising eight species.

DROSERA.—SUNDEW.

Drosera rotundifolia Linné.—*Round-leaved Sundew.*

Description.—Calyx: sepals as in the character of the order. Corolla: petals oblong, white. Styles very short, bifid. Seeds linear, with a loose, membranaceous coat. Leaves orbicular, spreading, abruptly narrowed to a long, hairy petiole. Scape erect, smooth, 4 to 10 inches high, 5- to 10-flowered. The long, glandular hairs are tipped with minute drops of glutinous material which in sunshine look like dew-drops, whence the common name, sundew. Annual or biennial, flowering from June to August.

Habitat.—In sphagnous swamps and bogs from the Arctic regions to the Gulf of Mexico; also in corresponding latitudes of the Eastern hemisphere.

Part Used.—The herb—not official.

Constituents.—The juice of sundew is bitter and acrid, but its chemical constituents are unknown.

Preparations.—The expressed juice and an alcoholic tincture of the recent plant have been employed.

Medical Properties and Uses.—The therapeutic virtues of this plant are altogether problematical. It is said to have been used with good effect in pulmonary phthisis, but as the same statement has been made regarding almost every plant known, the reader, in the absence of positive evidence, may draw his own conclusions. The juice, employed topically, is said to cure warts and corns.

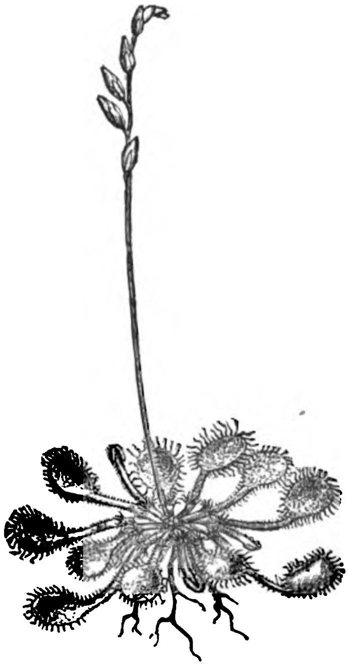


FIG. 111.—Drosera rotundifolia.

HYPERICACEÆ.

Character of the Order.—Herbs or shrubs, with opposite, entire, dotted leaves, and commonly yellow flowers. Sepals 4 or 5, distinct or cohering, unequal, dotted, persistent. Petals 4 or 5, hypogynous, generally oblique and twisted in the bud, often dotted. Stamens indefinite, hypogynous, collected in three or more clusters. Ovary single; styles several, rarely united; stigma simple, occasionally capitate. Fruit a capsule, many-valved, many-seeded; juice acrid and resinous.

A comparatively large order, but represented in North America by only three genera, namely, Ascyrum, Hypericum, and Elodes.

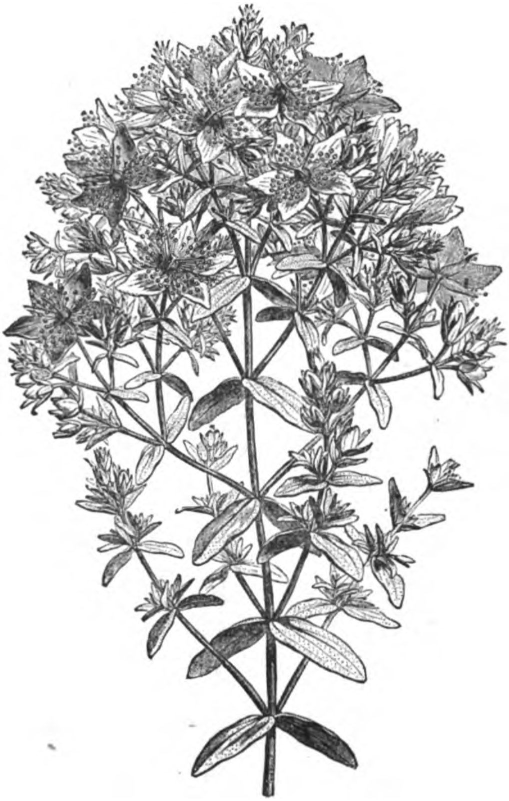


FIG. 112.—Hypericum perforatum.

HYPERICUM.—ST. JOHN'S WORT.

Hypericum perforatum Linné. — *St. John's Wort.*

Description.—Calyx: sepals 5, nearly equal, erect, acute, persistent. Corolla: petals 5, oblique, convolute in the bud, ovate, twice as long as the sepals, deep yellow with black dots. Stamens very numerous, in 3 or 5 clusters; anthers dotted like the petals. Styles 3, separate, commonly diverging. Capsule 3-celled, many-seeded.

An herbaceous perennial weed, with a ligneous root and an erect branching stem, 1 to 1½ foot high. Leaves opposite, entire, sessile, elliptical-oblong or oblong-linear, beset with numerous pellucid dots resembling perforations, whence the specific name. Flowers numerous, in open leafy cymes, appearing throughout the summer.

Habitat.—St. John's wort is a plant of Eastern origin which has become naturalized in all temperate regions, and is to the farmer a most pernicious weed and one very difficult to eradicate.

Part Used.—The flowering tops—not official.

Constituents.—St. John's wort has as yet yielded to analysis nothing more interesting than a peculiar red coloring matter, and nothing whatever to inspire confidence in its therapeutic activity.

Preparations.—There are no official preparations. The flowering tops, digested with olive or linseed oil, yield a yellowish-red product, termed *oleum hyperici*, or *red oil*, which is a preparation considerably used in domestic practice.

Medical Properties and Uses.—In ancient times, when nature unaided was supposed to be incompetent to heal a cut or cure a contusion, St. John's wort was very highly esteemed, and, it may be added, it is still esteemed by those who hold the same opinions of nature's powers. In scientific medicine, however, it holds no place, having become obsolete long ago. One author only of comparatively recent date considers "the saturated tincture nearly as valuable as that of arnica for bruises, etc." As tincture of arnica, however, apart from the alcohol which it contains, is of doubtful efficacy in these cases, the above statement does not tend to inspire faith in St. John's wort.

CARYOPHYLLACEÆ.

Character of the Order.—Herbs, with stems swollen at the joints, opposite, entire leaves, and regular flowers. Sepals 4 or 5, distinct or cohering, persistent. Petals 4 or 5, with narrow claws, sometimes wanting. Stamens distinct, not more than twice the number of the sepals, hypogynous or perigynous. Ovary solitary, often supported on a stalk, commonly 1-celled, occasionally 3- to 5-celled, with a free central placenta; styles 2 to 5, sometimes united into one. Fruit a 1-celled, many-seeded capsule, opening by 2 to 5 valves or by teeth at the apex.

Few strictly North American species of this large order are known to possess medicinal virtues. Indeed, plants of this order are everywhere characterized by blandness and an absence of active or irritating properties.

SAPONARIA.—SOAPWORT.

Saponaria officinalis Linné.—*Soapwort, Bouncing Bet.*

Description.—Calyx: sepals united, forming a cylindrical tube, divided at the apex into five pointed teeth. Corolla: petals 5, limb somewhat cordate, claw long and angular with an appendage at the top. Stamens 10, longer than the calyx. Styles 2. Capsule short-stalked, 1-celled, 4-toothed, many-seeded.

A perennial herb, strongly rooted, with erect stem 1 to 2 feet high. Leaves oval, entire, pointed, 3-ribbed, connate. Flowers in axillary and terminal clusters, pale rose-colored or nearly white, often double, appearing from July to September.

Habitat.—A native of Europe, soapwort has escaped from gardens and is often met with fully established in waste places and along roadsides.

Part Used.—The root—not official.

Constituents.—Soapwort has a sweetish, glutinous, and somewhat bitter taste, followed by a certain degree of acrimony. Its only important constituent is *saponin*, which causes decoctions of the root, upon agitation, to produce a saponaceous froth.

Preparations.—There are none. It may be employed in decoction.

Medical Properties and Uses.—A hundred years or more ago soapwort was believed to be a valuable alterative, and was employed in syphilis, gout, rheumatism, etc., with effects similar to those attributed to sarsaparilla. Little has been added to our knowledge of the plant since then. As it, in common with quillaia (*soap-bark*), contains *saponin*, it might reasonably be employed for the same purposes as the latter. That saponin, the active principle of these plants, is physiologically active is beyond question, but its therapeutic effects require further investigation.

SILENE.—CATCH FLY.

Silene Virginica Linné.—*Fire Pink, Catch Fly.*

Description.—Calyx: sepals united, forming an oblong-cylindrical tube, 5-toothed at the apex, viscid-pubescent. Corolla: petals 5, oblong, limb 2-cleft, 1 inch long. Stamens 10, longer than the calyx. Styles 3, rarely 4. Capsule 1-celled, 3- or 6-toothed at the apex, many-seeded.

A viscid-pubescent perennial herb, 1 to 2 feet high. Leaves thin, the lower spatulate, upper oblong-lanceolate. Flowers few, large, deep crimson, peduncled, in loose cymes, appearing from June to August.

Habitat.—In rich, open woods from Canada to Georgia and westward to the Mississippi. Rare in New York and New England.

Part Used.—The root—not official.

Constituents.—Unknown.

Preparations.—There are none. It has been used in decoction.

Medical Properties and Uses.—From Barton we learn that this plant was used in Virginia as an anthelmintic, but he seems to have had no personal experience with it; and since his time we have no record of experiments to test its efficacy.

MALVACEÆ.

Character of the Order.—Herbs or shrubs, with alternate, stipulate, palmately veined leaves and regular flowers. Sepals 5, united at the base, valvate in the bud, persistent, often bearing an involucre of bracts outside, forming a kind of external calyx. Petals 5, convolute in the bud, often large and showy. Stamens indefinite, hypogynous; filaments coherent, forming a column and united at their base with the claws of the petals; anthers reniform, opening along the top. Ovary compound, formed by the union of several carpels around a common axis; styles as many as the carpels, distinct or united. Fruit a many-valved and usually many-seeded capsule.

A large order of mostly tropical and sub-tropical plants, many of which are cultivated for ornamental or economic purposes. In general they are mucilaginous and have no active or deleterious properties. There are, however, some exceptions. The species indigenous to North America have not been investigated to any considerable extent, but from what is known of the order as a whole, there is little reason for believing that such investigation would yield very important results.

ALTHÆA.—Marsh-Mallow.

Althæa officinalis Linné.—*Marsh-Mallow.*

Description.—Calyx: sepals united at the base, the free segments narrowly triangular, acute; involucre of 7 to 10, erect, subulate, triangular segments half as long as the calyx; both calyx and involucre densely pubescent, persistent. Corolla: petals obcordate, wedge-shaped, coherent at their bases, pale rose-color, twisted in the bud. Stamens as in the character of the order. Ovary roundish, flattened, many-celled, each cell containing a single ovule; styles numerous, coherent at the base, free above, stigmatic on the inner side. Fruit flattened-spherical, composed of numerous dry, round, flattened, indehiscent carpels attached to, and radiating from a central axis, separating from each other at maturity.

An herbaceous perennial, with a large, long, fleshy, tapering root, and numerous erect, stiff stems, 2 to 4 feet high. Leaves on long petioles, the lower roundish-ovate, the upper triangular-oval or somewhat 3- to 5-lobed, irregularly cut, acutely serrate, finely pubescent; stipules narrowly triangular, caducous. Flowers 1 to 2 inches wide, in axillary clusters of 2 to 4 each, and terminal, leafy panicles, appearing in August and September.

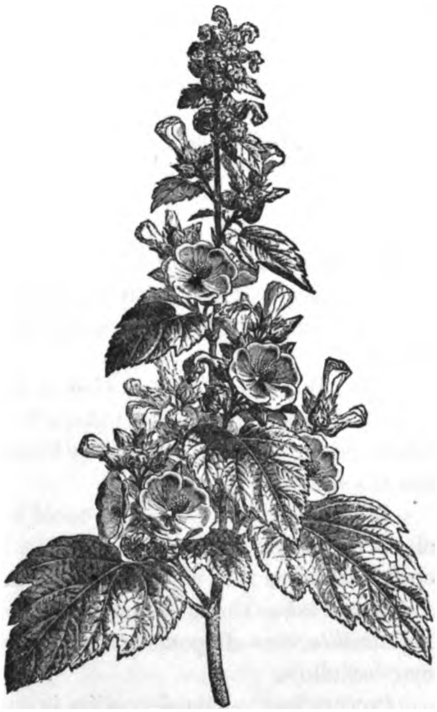


FIG. 113.—Althæa officinalis.

Habitat.—Indigenous to Europe, but naturalized in salt marshes along the coast of New England, New York, and New Jersey.

Part Used.—The root—*United States Pharmacopœia.* The root of the cultivated plant is commonly employed, and, as occurring in commerce, is deprived of its bark.

Constituents.—The dried root contains as its most important constituents about twenty-five per cent. each of starch and mucilage. There are also present pectin, asparagin, sugar, phosphate of calcium, cellulose, and a little fatty oil.

Preparations.—Syrupus althææ—syrup of althæa.—*United States Pharmacopœia.* This is made by dissolving sugar, without heat, in a cold infusion of the root, and is therefore practically free from starch, boiling water being necessary to extract all the soluble constituents, while the mucilaginous properties are readily imparted to cold water. The powdered root is often used to impart a proper consistence to soft pill masses, and also in the preparation of emollient poultices.

Medical Properties and Uses.—The constituents of marsh-mallow indicate clearly enough its therapeutic application. It is emollient and demulcent, and may be used freely in inflammatory affections, either internally or topically as occasion requires. Being nutritious also it is, in certain cases, superior to many demulcents in common use. As a topical application it has a wide range of usefulness.

MALVA.—MALLOW.

Malva rotundifolia Linné.—*Common Mallow.*

Description.—Calyx with a 3-leaved involucre; otherwise as in althæa. Corolla, stamens, ovary, styles, and fruit similar in structure to those of althæa.

A small biennial herb, with a long, tapering root and procumbent stems. Leaves round, heart-shaped, somewhat plaited, crenate, smooth, bluish-green, on long petioles. Flowers small, whitish, appearing throughout the summer.

Habitat.—One of the commonest weeds in door-yards and waste places about dwellings. A native of Europe, it follows civilized man most persistently and takes root wherever he establishes himself.

Part Used.—The herb, including the root—not official.

Constituents.—It possesses mucilaginous properties similar to those of marsh-mallow.

Preparations.—The decoction is employed in domestic practice. The fresh herb, bruised, is employed topically.

Medical Properties and Uses.—Similar to those of marsh-mallow.

GOSSYPIUM.—COTTON.

Gossypium herbaceum Linné.—*Cotton Plant.*

Description.—Calyx tubular-campanulate, obscurely 5-toothed, much shorter than the epicalyx of 3 large, cordate, deeply incised and toothed leaves. Corolla: petals large, convolute in the bud, spreading when expanded, irregularly obovate-truncate, wedged-shaped at the base, yellow, with a purple spot changing to reddish-brown. Stamens numerous, united and forming a long tube, connected at the base with the claws of the petals. Ovary conical, 3- to 5-celled, many-ovuled. Style simple, longer than the stamens · stigma clavate, slightly 3- to 5-lobed. Fruit a 3- to 5-celled capsule, opening at maturity through the middle of the cells and exposing numerous seeds covered with the white filaments so well known as cotton.

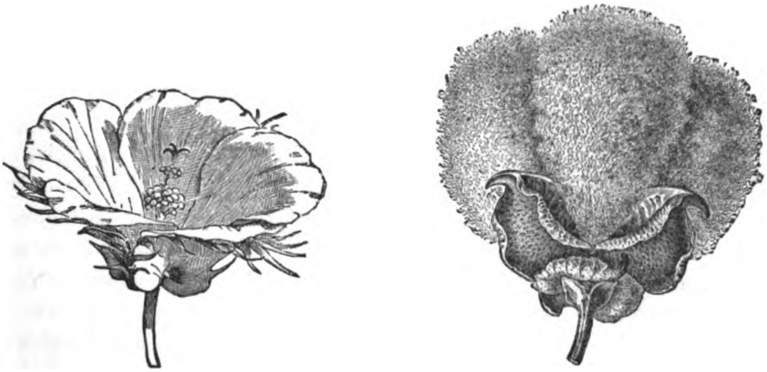


FIG. 114.—Gossypium herbaceum. Flower and fruit.

A stout herbaceous plant, with an erect, branching, leafy stem, about 5 feet high, naturally perennial but cultivated as an annual. Leaves large, 3 to 6 inches long, 3- to 5-lobed, with a single gland below, strongly veined, the lobes acuminate and mucronate; petioles about as long as the blade, stiff and angular. Lower leaves often 2- or 3-lobed. Flowers large, 3 inches broad, alternate, opposite the leaves; pedicels similar to the petioles but shorter.

Habitat.—The cotton plant has been cultivated for so great a length of time that its natural habitat is uncertain. It flourishes within the limits of 36° north and south of the equator. Though scarcely naturalized, the extent to which it is cultivated in the Southern States entitles it to a place among North American plants.

Part Used.—The bark of the root: Gossypii radicis cortex—cotton-root bark. Gossypium—cotton—*United States Pharmacopœia.*

Constituents.—Of cotton it is only necessary to state that the article directed by the Pharmacopœia is the so-called *absorbent cotton*, prepared by freeing the filaments from impurities and fatty matter.

Cotton-root bark contains, in addition to starch, glucose, and other common vegetable constituents, a resinous body whose exact character is as yet not fully established, but to which the medicinal virtues of the drug are attributed.

Preparations.—Of cotton-root bark: Extractum gossypii radicis fluidum—fluid extract of cotton root. Of cotton: Pyroxylinum—pyroxylin (*gun-cotton*).—*United States Pharmacopœia.*

Medical Properties and Uses.—Cotton root was introduced to professional notice as a specific uterine tonic after having long been used among the negroes of the Southern States as an abortifacient. Its action upon the uterus is similar to that of ergot, and it is used instead of the latter in cases of uterine inertia during parturition, and in amenorrhœa, dysmenorrhœa, and scanty menstruation. Whether its action upon the system at large be also similar to that of ergot is unknown but worthy of investigation.

The fact that the *bark* of cotton root should be possessed of such active properties is an interesting and suggestive one, for it affords the only instance of specific virtues attributed to a plant of the order *malvaceæ.* It will be noted that it is only the bark of the root that possesses these properties, all other parts of the plant partaking of the bland character of the order, the seeds especially—which not unfrequently possess the most active principles of plants—in this instance yielding a bland oil which is largely used as an adulterant of olive oil. Now in an order of plants of such strongly marked characteristics as the *malvaceæ*, the discovery of striking properties in any individual should stimulate investigation of other related individuals, for it may reasonably be assumed that investigation which starts with a rational clue will be more fruitful in results than if conducted entirely in a haphazard manner.

LINACEÆ.

Character of the Order.—Herbs, with entire, alternate, opposite or verticillate, exstipulate leaves, and regular, symmetrical, hypogynous flowers. Sepals 3 to 5, imbricate. Petals 3 to 5, convolute in the bud. Stamens 3 to 5, usually with intermediate abortive ones, united into a short tube at the base. Pod having twice as many cells as there are styles, each 1-seeded.

A small order, represented in North America by the genus Linum, comprising no indigenous species of medicinal or economic importance. The species described below, though introduced, has been under cultivation so long that it requires brief notice.

LINUM.—FLAX.

Linum usitatissimum Linné.—*Common Flax.*

Description.—Calyx: sepals ovate, acute. Corolla: petals large, with a broad limb and short claw, deep violet-blue, fugacious. Stamens 5, alternating with five abortive ones, all united at the base, forming a short tube; anthers small, versatile, deep blue. Ovary flask-shaped, 5-celled at the base, each cell 2-ovuled; styles 5, distinct. Fruit an imperfectly 10-celled capsule.

An erect annual, 1 to 2 feet high. Stem commonly solitary, stiff, smooth, round, branching near the top. Leaves alternate, sessile, linear-lanceolate, acuminate, entire. Flowers solitary, at the ends of the branches.

Habitat.—Flax has been cultivated from time immemorial, so that its native home is unknown. In all countries where cultivated it becomes sparingly naturalized, occurring spontaneously under favorable circumstances.

Part Used.—The seed. Official name, Linum—*United States Pharmacopœia.*

Constituents.—The most important constituents of flaxseed are fixed oil and mucilage—both too well known to require comment.

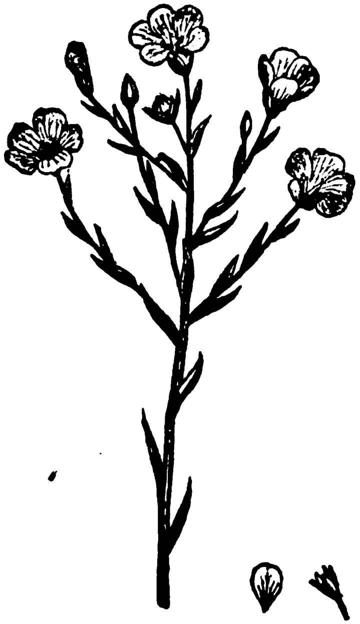


FIG. 115.—Linum usitatissimum.

Preparations.—Oleum lini—oil of flaxseed.—*United States Pharmacopœia.* The seed, unground, is employed in decoction; ground, under the name of *flaxseed meal* or *ground flaxseed*, in the preparation of poultices, etc.

Medical Properties and Uses.—Flaxseed tea is largely employed as a demulcent in febrile and inflammatory affections, and topically as an injection in diseases of the bladder, rectum, and vagina. The seed has also been recommended as a substitute for cod-liver oil, on account of the nutritious material which it contains. Flaxseed poultices are all but universally employed in cases requiring emollient applications. Flaxseed—or, as it is commonly termed, linseed—oil is less used in medicine and pharmacy than formerly. As a topical agent it is often objectionable on account of its drying properties. It was formerly used in the official *Linamentum calcis—lime liniment—U. S. P.* (*carron oil*), but has been displaced by *cotton-seed oil*, because the latter is not possessed of drying properties and hence does not impart to surgical dressings the inconvenient and disagreeable stiffness so generally experienced with the old preparation.

Linseed oil has also been recommended as a substitute for cod-liver oil, but as such has not borne the test of clinical experience in a manner to inspire faith in its efficacy. So far as the mere elements of nutrition are concerned, there appears to be no great difference between the two, but there are other factors to be considered in the case of cod-liver oil. The traces, slight though they be, of iodine, bromine, phosphorus, etc., present in this oil are certainly of therapeutic importance, and serve to make it not, as some have claimed, a mere fatty food, but a strongly medicinal food, for which we cannot reasonably expect to find a complete substitute in the vegetable kingdom.

GERANIACEÆ.

Character of the Order.—Annual or perennial herbs, or, in some exotic species, low shrubs, with swollen joints, opposite or alternate, commonly palmately veined leaves, with or without stipules. Flowers commonly 5-merous, regular and symmetrical, hypogynous; sometimes 3-merous; occasionally unsymmetrical, especially as regards the calyx and corolla. In the most characteristic genera the arrangement is as follows: sepals 5, imbricate, persistent; petals 5, convolute in the bud, deciduous; stamens 5 or 10—when of the latter number the alternate ones shorter or abortive; ovary 5-celled, each cell 2-ovuled, arranged about an elongated axis, to which the styles are adherent; fruit 5-celled, each cell 1-seeded, separating at the base when mature, curling upward, and when detached leaving the dry axis persisting.

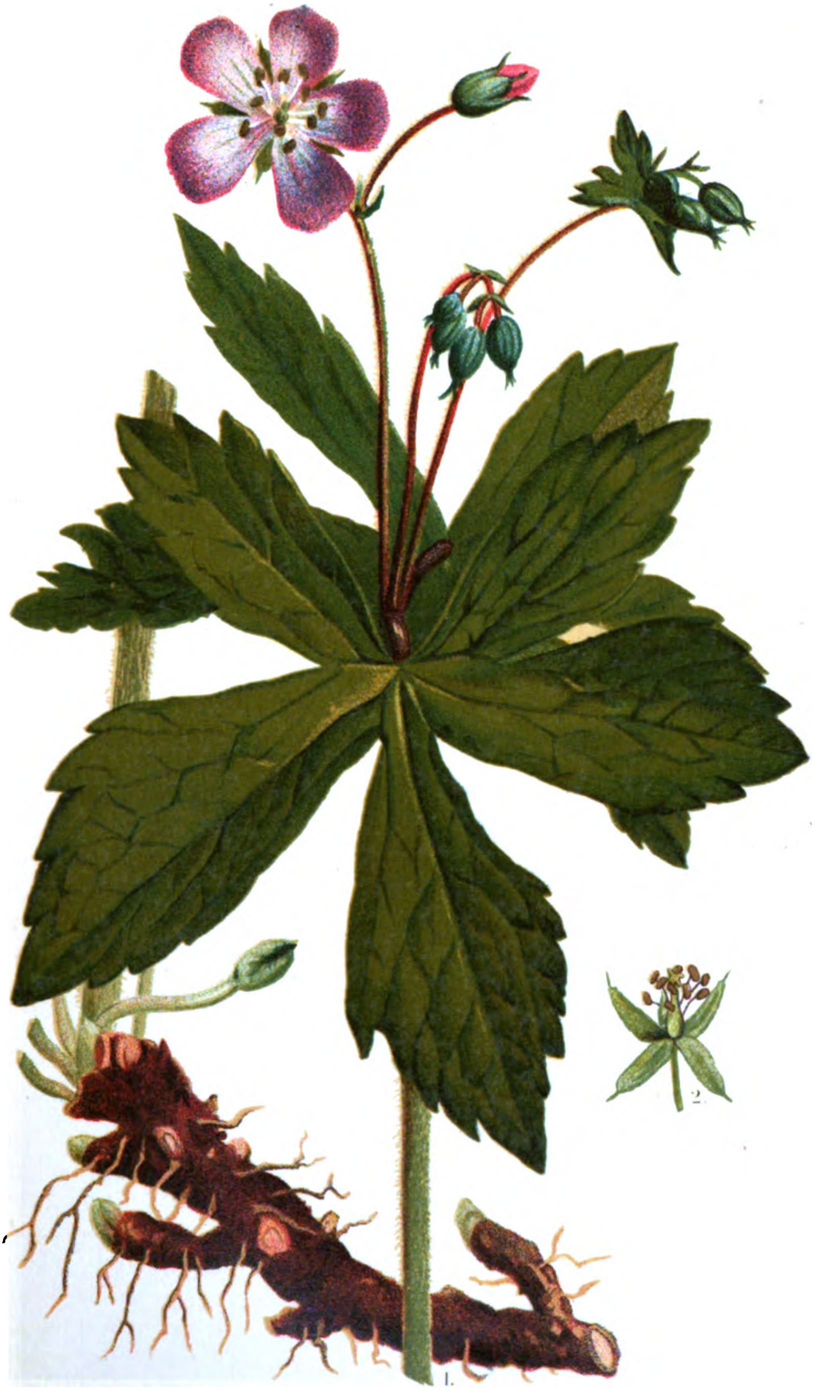
The order is difficult to characterize as a whole, some of the unsymmetrical individuals being very perplexing; as these, however, are of no medicinal importance they need not receive our attention. There are altogether half a dozen North American genera, namely, Erodium, Floerkia, Geranium, Impatiens, Limnanthes, and Oxalis.

GERANIUM.

Geranium maculatum Linné.—*Spotted Geranium, Wild Cranesbill.*

Description.—Calyx: sepals lanceolate, pointed, hairy, persistent. Corolla: petals broadly obovate or rounded, pale purple, becoming lighter after expansion, fugacious; claw short, bearded. Stamens 10, all with perfect anthers, the five longer ones with small glands at their base alternate with the petals; anthers versatile, 2-celled, purple. Ovary 5-celled; pistils adherent to the axis, free at the summit and recurved, with stigmatic surfaces inward. Fruit composed of 5 dry, hairy, 1-seeded carpels, separating at the base when mature, and curving upward elastically, the inner surface smooth.

An herbaceous perennial. Rhizome cylindrical, 2 to 3 inches long,



L. Johnson. Del.

GERANIUM MACULATUM.

H. BENCKE LITH. N.Y.

Plate IV.—Geranium maculatum.

FIG. 1.—Flowering plant (young), natural size.

FIG. 2.—Flower, deprived of corolla ; natural size.

one-half inch thick, more or less branched, pale reddish-brown, with numerous fibrous rootlets. Stem erect, 1 to 2 feet high, somewhat branched dichotomously, hairy. Radical leaves large, on long hairy petioles, deeply cut into 5 or 7 segments, which are cuneate or oblong, and lobed and cut at the end; stem-leaves similar in shape but much smaller, opposite, placed at the forks of the stem, sessile or on short petioles. All the leaves are at first green, but as they grow old become more or less blotched with whitish spots. The flower-stalks arise from the forks of the stem, each bearing two flowers, one inch in diameter, on short pedicels. The flowers are produced from May till July.

Habitat.—Spotted geranium is one of the commonest plants in open woods from Canada to Florida, and during its period of blooming is conspicuously beautiful. Though its flowers are less showy than those of many of the exotic garden geraniums (*pelargonium*), to the lover of nature they are far more interesting when seen displayed in lavish profusion in their native home, the woods.

Part Used.—The rhizome—*United States Pharmacopœia.*

Constituents.—Geranium root has a simple astringent taste, due to a considerable percentage of tannic and gallic acids, which appear to be its only important constituents, though there are also present gum, starch, pectin, resin, coloring matter, etc.

Preparations.—Extractum geranii fluidum—fluid extract of geranium. —*United States Pharmacopœia.* As geranium imparts its virtues readily to both water and alcohol, it may be administered in decoction or tincture. In many cases to which the drug is applicable the decoction is by far the most eligible preparation.

Medical Properties and Uses.—Geranium is justly considered one of our best indigenous astringents—one, however, whose virtues are not fully appreciated by the profession at large. Though active and efficient, it is still mild and unirritating and devoid of all unpleasant or offensive properties. It is therefore particularly suited to the later stages of diarrhœa and dysentery, especially in children. In such cases a decoction in milk has been found very serviceable. It has also been employed internally in a variety of hemorrhages, with asserted benefit. As a topical astringent it has a still wider field of usefulness, and may be employed in any case to which this class of remedies is applicable, such as catarrhal inflammations and hemorrhages from mucous surfaces. As an injection in gonorrhœa, gleet, and leucorrhœa, the decoction is much more serviceable than a simple solution of tannin, doubtless from the fact that there is present mucilaginous material which exerts a soothing influence. In fine powder the drug may be employed as a styptic in bleeding from the nose and from the gums after the extraction of teeth.

Finally, geranium, though possessing no properties of a specific character, is undeniably a valuable astringent, and since the cases to which it is applicable are so numerous and the plant everywhere so common, one is led to wonder that it is not more generally employed.

OXALIS.—WOOD-SORREL.

Character of the Genus.—Sepals 5, distinct or united at the base, imbricate, persistent. Petals 5, sometimes united at the base, withering. Stamens 10, more or less united at the base, those opposite the petals longer than the others; anthers versatile. Ovary of 5 united carpels, not beaked; styles distinct. Fruit a 5-celled, 5-angled capsule opening by as many valves, each cell 2-seeded.

Herbs, either annual or with a tuberous or creeping perennial rhizome. Leaves alternate or radical, palmately trifoliate.

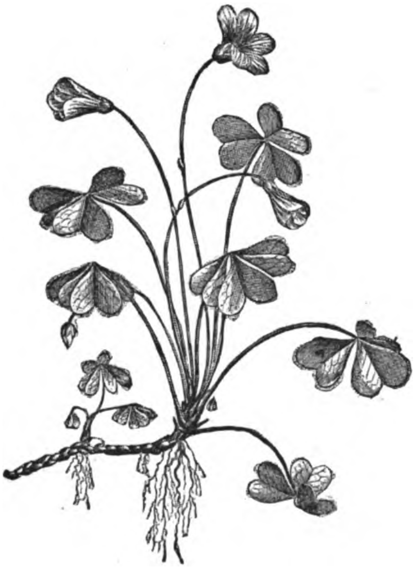


FIG. 116.—Oxalis Acetosella.

Oxalis Acetosella Linné.—*Wood-Sorrel.*

Description. — Calyx: sepals small, ovate, obtuse. Corolla: petals obovate, unguiculate, one-half inch long, white with reddish veins. Capsule ovoid. Perennial. Root-stock creeping, slender, scaly toothed. Leaves all radical on long petioles; leaflets broadly obcordate. Scapes 2 to 5 inches long, 1-flowered, appearing in June.

Habitat.—In cold woods from the Alleghanies northward; also in Northern Europe and Asia.

Oxalis stricta Linné.—*Yellow Wood-Sorrel, Sheep-Sorrel.*

Description.—Flowers similar in structure to the preceding, but smaller and borne upon 2- to 6-flowered, axillary peduncles, yellow. Capsules elongated. Annual, or by means of subterranean shoots, perennial. Stem erect, leafy. Flowers appear throughout the summer.

Habitat.—Common in waste and cultivated grounds.

Part Used.—The leaves—not official.

Constituents.—All plants of this genus have, to a greater or less extent, an agreeable acidulous taste due to the presence of binoxalate of potash, their only important constituent. This salt was formerly extracted from certain species of oxalis and was sold under the name of *salt of sorrel,* but it is now prepared from oxalic acid and potash.

Preparations.—There are none, save the commercial binoxalate of potash, and, as above stated, this is no longer prepared from the plant.

Medical Properties and Uses.—Oxalis is reputed to be useful in scurvy and scorbutic affections generally. As, however, binoxalate of potash has been shown to act more efficiently and more certainly than the plant, the latter may be considered obsolete. An infusion is refrigerant, and may be employed as a cooling drink in febrile affections.

RUTACEÆ.

Character of the Order.—Herbs, shrubs, or trees, with alternate or opposite, exstipulate, simple or compound leaves, dotted with pellucid glands, containing aromatic volatile oil. Flowers perfect or unisexual, regular, hypogynous, 3- to 5-merous. Stamens as many or twice as many as the sepals; ovary of 2 to 5 cells, distinct or united, each cell 1- to 2-ovuled; styles usually coherent; fruit a capsule or berry.

A large and widely distributed order, represented in North America by eight genera, two of which, namely, Xanthoxylum and Ptelea, comprise species of medicinal value.

XANTHOXYLUM.—PRICKLY ASH.

Character of the Genus.—Flowers diœcious. Sepals 4 or 5, in one species wanting. Petals 4 or 5, imbricate in the bud. Stamens 4 or 5, in the sterile flowers alternate with the petals. Pistils 2 to 5, distinct, but with styles conniving or more or less united. Carpels sessile or stipitate, 2-valved, 1- to 2-seeded.

Trees or shrubs, with alternate unequally pinnate leaves, the leaflets punctate with pellucid dots; stems and leaf-stalks commonly armed with prickles. Flowers small, greenish.

Xanthoxylum Americanum Miller (*X. fraxineum* Willdenow).—*Northern Prickly Ash, Toothache Tree.*

Description.—Calyx absent. Corolla: petals 5. Pistils 3 to 5, distinct; styles slender. Capsules stipitate, dotted, varying from green to red, 2-valved, 1-seeded.

A shrub, 5 to 10 feet high. Leaflets in about 5 pairs, with an odd terminal one, nearly sessile, ovate, acute, slightly serrate, somewhat downy underneath. Both leaves and flowers in axillary clusters, the latter appearing in April or May, before the former are expanded.

Habitat.—In rocky woods and on river banks from Virginia northward and westward; not common east of the Hudson River.

Xanthoxylum clava Herculis Linné (*X. Carolinianum* Lam).—*Southern Prickly Ash, Toothache Tree.*

Description.—Calyx: sepals 5. Corolla: petals 5. Pistils 3; styles short. Capsules 3, nearly sessile.

A small tree, with branches armed with long sharp prickles. Leaflets in 3 to 5 pairs and an odd terminal one, ovate-lanceolate, crenate-serrulate, oblique, shining above. Flowers in a terminal cyme, appearing in June after the leaves are expanded.

Habitat.—In dry soil near the coast, from Florida to North Carolina and westward.

Part Used.—The bark of both species—*United States Pharmacopœia.* The fruit is also used to some extent, but is not official.

Constituents.—Prickly ash has a taste which is at first aromatic, then bitter, and finally persistently acrid. It contains volatile and fixed oils, resin, gum, coloring matter, and berberine, the latter being probably its most important constituent.

Preparations.—Extractum xanthoxyli fluidum—fluid extract of xanthoxylum.—*United States Pharmacopœia.* It yields its virtues readily to boiling water and to alcohol, and may therefore be administered in decoction or tincture. The fruit is used in like manner.

Medical Properties and Uses.—Prickly ash is stimulant and diaphoretic, and has long enjoyed a certain degree of popularity as a remedy for chronic rheumatism. It powerfully stimulates secretion from mucous surfaces, causes a sensation of warmth in the stomach, and undoubtedly exerts an eliminant influence. Hence it has been used with benefit in constitutional syphilis. As a tonic it is manifestly inferior to its alkaloid, berberine, but as an alterative and eliminant much superior. It is employed topically in domestic practice as a remedy for toothache and as a counter-irritant, and has been recommended as a local application in chronic pharyngitis characterized by dryness of the mucous membrane.

PTELEA.—SHRUBBY TREFOIL.

Ptelea trifoliata Linné.—*Shrubby Trefoil, Hop Tree.*

Description.—Calyx: sepals 3 to 5, small. Corolla: petals 3 to 5, imbricated in the bud, much longer than the sepals. Stamens 3 to 5, alternate with the petals; filaments densely villous below the middle, longer than the style in the sterile flowers, shorter in the fertile ones. Ovary 2-celled, each cell 2-ovuled; styles short or absent; stigma 2-lobed. Fruit an orbicular samara, 2-celled, 2-seeded, nearly one inch in diameter.

An unarmed shrub, 8 to 12 feet high. Leaves trifoliate, on petioles about 2 inches long; leaflets 2 to 4 inches long, oval or oblong, mostly acute, obscurely crenate-serrate, the lateral ones somewhat oblique, pubescent when young. Flowers polygamous, small, greenish-white, in compound terminal cymes, appearing in May and June, and having a disagreeable odor.

Habitat.—In rocky places from Pennsylvania to Florida and westward.

Parts Used.—The fruit, leaves, and bark of the root—not official.

Constituents.—The leaves contain tannic and gallic acids, the fruit a soft acrid resin, and the bark a peculiar resin and the alkaloid berberine.

Preparations.—None are official. The fluid extract and tincture occur as commercial articles and afford eligible modes of administration. It may also be employed in infusion.

Medical Properties and Uses.—Ptelea owes what little importance it possesses to its bitter tonic properties, and these are doubtless owing in a great measure to the berberine present. Moreover, as this alkaloid exists in the bark of the root in but small percentage, the drug cannot be considered very active. The other constituents of the plant, though somewhat aromatic, are probably of little medicinal value.

Like nearly all bitters, ptelea has been employed with success in intermittents, but no one at the present day would think of relying upon it in such cases. In convalescence and in atonic dyspepsia it may do the same service as many other feeble tonics, by increasing the appetite and stimulating the digestive functions.

ANACARDIACEÆ.

Character of the Order.—Trees or shrubs, with a resinous or milky, often caustic and poisonous juice, alternate, dotless, exstipulate leaves, and small, inconspicuous, regular, pentandrous flowers, with a 1-celled ovary, bearing a single suspended ovule, and having 3 styles or stigmas.

An order of strongly marked characteristics, comprising about one hundred species, mostly indigenous to the tropics. Represented in North America by three genera, namely, Pistacia, Schinus, and Rhus, the last-named alone comprising medicinal species.

RHUS.—SUMAC.

Character of the Genus.—Sepals 5, small, united at the base, persistent. Petals 5, ovate, spreading, inserted under the margin of a flattened orbicular disk at the bottom of the calyx. Stamens 5, inserted in or under the disk. Styles 3, distinct or united ; stigmas 3. Fruit a small dry drupe.

Shrubs or small trees, with alternate, unequally pinnate leaves, and small yellowish or greenish-white polygamous or polygamo-diœcious flowers.

The genus may be divided into two sections, well-marked both as to their structure and their properties.

§ 1. *Non-poisonous Species.*—Flowers polygamous, in a terminal thyrsoid panicle. Fruit clothed with a dense coating of crimson hairs ; stone smooth. Leaves unequally pinnate.

Rhus glabra Linné.—*Smooth Sumac.*

Description.—A smooth shrub, 2 to 12 feet high, the stem having a large pith and a thin, white, woody layer. Leaflets in 5 to 15 pairs, with an odd terminal one, lanceolate-oblong, pointed, serrate, smooth and glaucous above, whitish beneath. The flowers appear in June; the fruit ripens in September.

Habitat.—In dry, rocky, and rather barren places throughout the United States and Canada.

Rhus typhina Linné.—*Staghorn Sumac.*

Description.—A large shrub or small tree, 10 to 30 feet high, the young branches as well as the leaf- and flower-stalks densely coated with soft velvety hairs. Leaflets in 5 to 15 pairs, with an odd terminal one, oblong-lanceolate, pointed, serrate. The flowers appear in June; the fruit ripens in September. Much more robust than the preceding species. The pith, though large in the young branches, is surrounded in later years by a thick layer of rather dense yellow wood.

Habitat.—In rich uplands, United States and Canada.

Rhus copallina Linné.—*Dwarf Sumac.*

Description.—A small shrub, 1 to 7 feet high, with straggling branches and running roots. Branches and stalks downy. Petioles wing-margined; leaflets in 4 to 10 pairs, with an odd terminal one, oblong or ovate-lanceolate, oblique, smooth and shining above, pubescent beneath.

Habitat.—In barren and rocky situations, United States and Canada.

Parts Used.—Of Rhus glabra, the fruit—*United States Pharmacopœia.* The fruit of both *R. typhina* and *R. copallina* is possessed of properties identical with those of the official plant, and may be substituted as occasion requires. The leaves and bark of all the species have been employed but are not official.

Constituents.—Sumac berries, as they are called, have a pleasant acid, astringent taste, due to the presence of malic acid in the dense crimson pubescence which covers them. This acid is present both in a free state and in combination as malate of calcium, and is associated with tannic and gallic acids, coloring matter, etc.

Sumac leaves are comparatively rich in tannic and gallic acids, so much so, indeed, as to be of economic importance in the tanning of leather. Excrescences, or galls, are produced upon them which are said to be hardly inferior to the galls of commerce. The bark is also possessed of astringent properties, but to a more limited extent than the leaves.

Preparations.—Extractum rhois glabræ fluidum—fluid extract of rhus glabra.—*United States Pharmacopœia.* Of the other species there are no official preparations. The berries of all the species are frequently employed in infusion, and when they can be obtained in good condition this form is undoubtedly the most eligible one to use, either topically or internally. The leaves may be employed in infusion or decoction.

Medical Properties and Uses.—Sumac berries are astringent and refrigerant. An infusion has long been used in domestic practice, internally for refrigerant effect in febrile and inflammatory affections, and topically as a gargle for sore throat. Nor has its use been confined entirely to domestic practice, for many excellent practitioners, especially those resident in the country where the fruit is readily accessible, employ it habitually as a cooling drink and, either alone or as a basis, for gargles.

The leaves and bark owe whatever of medicinal activity they possess to the presence of tannic and gallic acids, and may be employed as simple vegetable astringents wherever such remedies are indicated.

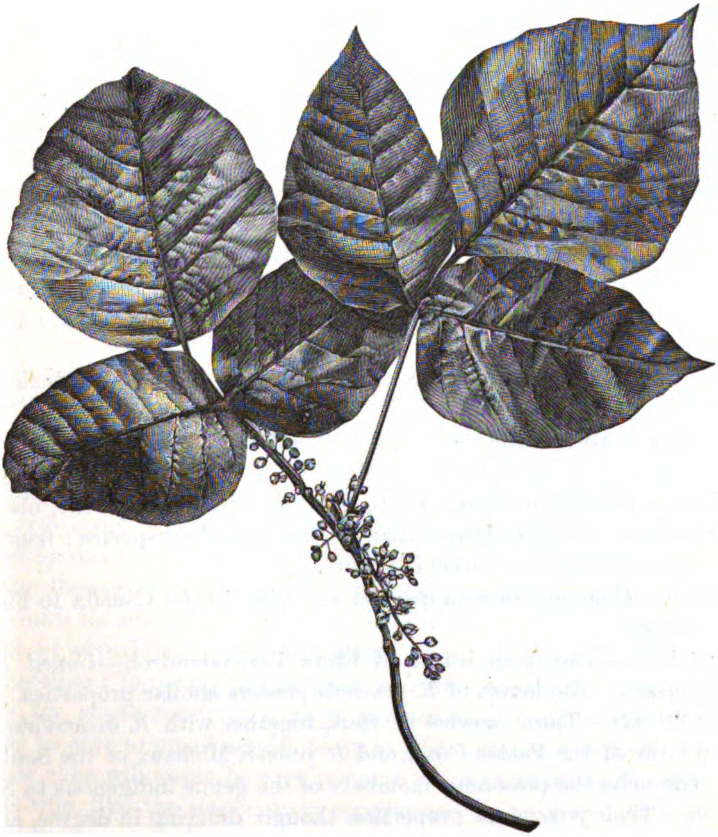


FIG. 117.—Rhus Toxicodendron. A flowering branch, one-half natural size.

§ 2. *Poisonous Species.*—Flowers polygamous, in loose and slender axillary panicles. Fruit globular, glabrous, whitish or dun-colored; stone striate. Leaves unequally pinnate or trifoliate.

Rhus Toxicodendron Linné.—*Poison Ivy, Poison Oak.*

Description.—A low shrub or tall climber, according to the circumstances in which it is placed. Leaflets 3, rhombic-ovate, entire, or variously cut and lobed, smooth and shining above, downy beneath. Panicles small, flowers minute, fruit about the size of small peas, greenish.

This common and, by many people, much-dreaded plant occurs in two rather distinct forms, which were formerly considered separate species, but are now recognized as specifically identical, their differences being due entirely to the circumstances of their growth. A plant growing in an open space with no convenient support near has the habit of a low shrub; while one rooted at the base of a tree or beside a rock puts forth innumerable adventitious rootlets, and by means of these climbs upward vigorously, never stopping, under favorable circumstances, until it has reached the highest point attainable. Another curious feature in the growth of the plant as a climber is that the increase in the thickness of the stem takes place almost entirely upon the side next the support, whether this be a rock, tree, or any other object, so that the pith is eccentric. As the rootlets bring no nourishment to the stem, and as they are put forth in quantity only when there is something near to fix themselves to, it appears probable, as the author endeavored to show some years ago, that they are produced by the mere stimulation of contact; and also that the increased growth on the side of the stem next the support is induced in the same manner. The climbing plant was formerly denominated *R. radicans*, a name, of course, now discarded.

Habitat.—Common everywhere from Canada to the Gulf of Mexico and westward.

Rhus venenata De Candolle.—*Poison Sumac, Poison Elder.*

Description.—A vigorous shrub, 6 to 18 feet high, with smooth, pale gray bark. Leaflets in 3 to 6 pairs, with an odd terminal one, obovate-oblong, entire. Panicles larger than in the preceding species; fruit also larger, greenish-yellow or greenish-white.

Habitat.—Common in swamps and wet places from Canada to Florida and westward.

Part Used.—The fresh leaves of Rhus Toxicodendron—*United States Pharmacopœia.* The leaves of *R. venenata* possess similar properties.

Constituents.—These species of rhus, together with *R. diversiloba* Torrey and Gray of the Pacific Coast and *R. pumila* Michaux of the Southern States, comprise the poisonous members of the genus indigenous to North America. Their poisonous properties, though differing in degree, are essentially identical in quality. *R. pumila* is said to be the most poisonous of the group, while *R. venenata* occupies a second place, being itself considerably more violent in action than *R. toxicodendron* or *R. diversiloba;* the two last-named resembling each other very much both in habit of growth and in their effects. The poisonous constituent of these plants, though considerably investigated, has not been as yet thoroughly characterized. That it is volatile is well known, and that it is an acid principle has also been demonstrated; but beyond this nothing is definitely known. Though volatile and capable of producing its peculiar effects upon very susceptible individuals, even at some distance from the growing plants, it may be preserved in proper solvents for a great length of time. The author himself has experienced poisonous effects from a tincture of *R. venenata* prepared thirty years before, which was applied by way of experiment. Peculiar as the principle is, it finds its parallel in the well-known fact that only certain persons are susceptible to its influence. This susceptibility may exist in all the members of a family, or in one or two only, the others enjoying complete immunity. And again, there are great differences in the degree of the susceptibility of different individuals. One may be violently poisoned by the emanations from a growing plant, while another may require actual contact to produce even slight manifestations. The poisonous principle is present in all parts of these plants, but is most concentrated in the milky juice. The other constituents are unimportant and inert, being only the ordinary vegetable principles.

Preparations.—None are official. The fresh leaves of *R. Toxicodendron* were admitted into the Pharmacopœia with the idea that the prescriber would order a tincture made from them according to the formula provided for tinctures of fresh herbs. The other species are susceptible to similar treatment. There can be no doubt that an alcoholic tincture kept tightly corked is the best means for preserving the drug in activity.

Medical Properties and Uses.—Here we are altogether in the dark. Cases are reported of persons suffering from various cutaneous eruptions having been permanently cured by accidental rhus-poisoning. Cases are now and then reported also of paralytics having been restored by strokes of lightning, yet paralytics, as a rule, would prefer not to undergo such heroic treatment. Granting that it may be possible to cure certain skin diseases by this substitutive action, the first thing to decide in a given case would be the susceptibility of the patient to the remedy, and the second, how to limit its action within reasonable bounds. In endeavoring to settle the first by experiment, great risk would be run of going beyond the second altogether; for as no man has yet discovered anything like an infallible remedy for rhus-poisoning, though palliatives are numerous, no one is likely to be able to prescribe limits for it when used as a remedy. Certain it is that rhus will never be very popular as an external application with patients who, like the writer, have experienced its poisonous effects. Regarding its use as an internal remedy, still less need be said. Nearly all the testimony to its value when used in this manner comes from sources discredited in scientific medicine. It is claimed, of course, that it exerts specific effects in certain cases, even when administered in infinitesimal doses; but when we consider that personal susceptibility is the first requisite for any effect whatever, we may well doubt the specific effect of even minute doses upon humanity, or disease, at large. Finally, admitting the potency of rhus as a cause of disease, we have yet to learn its power and mode of use as a remedy.

RHAMNACEÆ.

Character of the Order.—Shrubs or small trees, with simple, alternate leaves, often thorny branches, and small polygamous or diœcious flowers. Calyx with 4 or 5 short deciduous teeth or sepals, valvate in the bud. Petals 4 or 5, very small, folded inward in the bud; sometimes wanting. Stamens as many as the sepals and alternating with them, inserted with the petals on a disk which lines the tube of the calyx. Ovary 2- to 5-celled, each cell 1-ovuled; style very short; stigmas 2 to 5. Fruit a small berry or drupe enclosing 2 to 5 one-seeded nuts.

A widely distributed order of more than forty genera, about a dozen of which are represented in North America—two, Rhamnus and Ceanothus, comprising medicinal species.

RHAMNUS.—BUCKTHORN.

Character of the Genus.—Calyx 4- or 5-cleft, cup-shaped, lined with a thin disk. Corolla: petals as many as the teeth of the calyx, small, short-clawed, notched at the end, folded about the stamens; sometimes wanting. Ovary free, 2- to 4-celled. Drupe or berry containing 2 to 4 nutlets.

Shrubs or small trees. Leaves smooth, feather-veined. Flowers small, greenish, in axillary clusters. Fruit black.

Rhamnus cathartica Linné.—*Common Buckthorn.*

Description.—Calyx 4-cleft. Corolla: petals very narrow, not longer than the teeth of the calyx. Fruit about the size of a pea.

A smooth shrub, 6 to 15 feet high, with spreading branches, the smaller ones often ending in a stout thorn. Leaves 1½ to 2 inches long, two-thirds as wide, ovate, acuminate, serrate, with a few prominent, obliquely diverging veins. Flowers diœcious, thickly clustered in the axils of the leaves, appearing in May and June.

Habitat.—A native of Europe and Asia, but sparingly naturalized in the Northern Atlantic States.

Rhamnus Purshiana De Candolle.—*California Buckthorn, Sacred Bark.*

Description.—Calyx 5-cleft. Corolla: petals 5, two-lobed. Styles rather short, united to the summit; stigmas 3. Fruit turbinate, 3-seeded, the size of a large pea.

A shrub or small tree, 10 to 20 feet high, with a trunk sometimes 8 or 9 inches in diameter. Leaves 3 to 5 inches long, 1½ to 2 inches in diameter, sometimes slightly cordate at the base, rarely acute or with a slight acumination; the lower surface strongly pubescent, the lateral veins prominent. Flowers umbellate, in clusters of 10 to 20.

Habitat.—On the Pacific Coast from California northward.

Parts Used.—Of Rhamnus cathartica, the fruit—not official; of R. Purshiana, the bark—not official.

Constituents.—The berries of common buckthorn are pulpy and contain a deep green juice, having a faint unpleasant odor, a bitterish, acrid, nauseous taste, and possessing active purgative properties. Various analyses have demonstrated the presence of a peculiar principle termed *rhamnocathartin,* to which the berries owe their activity. The bark of the plant is also actively purgative.

An analysis of the bark of R. Purshiana made by Professor A. B. Prescott yielded a bitter brown resin, a red resin, a light yellow resin, tannic, malic, and oxalic acids, a neutral crystallizable substance, and a volatile oil, but experiments have not been made to ascertain which of these possesses the therapeutic properties of the bark.

Preparations.—A syrup of buckthorn made from the juice of the berries is official in Britain, France, and Germany. Of R. Purshiana there are commercial fluid extracts and elixirs in profusion, but no official preparations.

Medical Properties and Uses.—All the species of rhamnus thus far subjected to experiment possess purgative properties of greater or less activity. In general their action is harsh and violent. Nausea and vomiting, as well as severe griping pains, not unfrequently attend their purgative action. For this reason *R. cathartica* and *R. Frangula* (*Frangula bark*) have never found much favor in this country, and even in Europe they are commonly administered with aromatics and correctives in order to diminish the violence of their action. Some years since *R. Purshiana* was introduced to professional notice in this country under the absurd and fanciful title of *cascara sagrada,* and most energetic efforts were made to gain for it an entirely unmerited reputation as a remedy for constipation, etc. Even when administered in pleasant-tasting elixirs—of, to the prescriber, unknown composition—its action is not unfrequently attended with nausea and griping. There is little reason for considering it as essentially different from or more valuable than frangula bark or common buckthorn, and hence its popularity, being forced and fictitious, will be short-lived.

CEANOTHUS.—New Jersey Tea.

Ceanothus Americanus Linné.—*New Jersey Tea, Red Root.*

Description.—Calyx bell-shaped, 5-cleft, the lobes white, incurved; the lower part with a disk cohering with the ovary, the upper finally separating transversely. Corolla: petals 5, hooded, on slender claws longer than the calyx, white. Stamens exserted; anthers ovate, 2-celled. Ovary 3-celled; styles 3, united to the middle, diverging above. Fruit bluntly triangular, dry, coriaceous, separating into three carpels when mature.

A freely branching shrub, 2 to 4 feet high, the younger branches pubescent. Root dark red. Leaves 2 to 3 inches long, ovate or oblong-ovate, obtuse or slightly acuminate, 3-ribbed, serrate, pubescent beneath; sometimes slightly cordate at the base. Flowers in axillary clusters, appearing in July.

Habitat.—Common in dry woodlands from Canada to Florida and westward.

Parts Used.—The leaves and root—not official.

Constituents.—Both the leaves and root are astringent and contain a considerable percentage of tannin.

Preparations.—None are official. There are commercial fluid extracts fairly representing the plant; the decoction is most commonly used.

Medical Properties and Uses.—The leaves were used during the Revolution and also to some extent during the late Civil War as a substitute for tea, and both leaves and root have been employed internally and topically as astringents.

CELASTRACEÆ.

Character of the Order.—Shrubs or small trees, with alternate, rarely opposite, simple leaves. Flowers in small axillary cymes, small, green, white, or purple; sepals and petals 4 or 5, imbricate in the bud; stamens 4 or 5, alternate with the petals, inserted on a large disk which surrounds and encloses the ovary. Fruit 2- to-5 celled, capsular or drupaceous; seeds arilled.

An order comprising thirty-five genera. Represented in North America by seven—two only, Celastrus and Euonymus, comprising medicinal species.

CELASTRUS.—STAFF TREE.

Celastrus scandens Linné.—*Woody Bittersweet.*

Description.—Calyx turbinate, 5-cleft. Corolla: petals 5, ovate or oblong, sessile. Stamens inserted into the margin of the fleshy disk. Ovary surrounded by the disk, 3-celled; styles 3, united. Fruit a globular capsule, orange-colored, 3-celled, 3-valved, the valves at maturity opening and folding backward, exposing the seeds enclosed in a fleshy, crimson aril.

A twining shrub, often climbing trees to the height of twenty or thirty feet. Leaves ovate-oblong, finely serrate, pointed. Flowers polygamo-diœcious, inconspicuous, appearing in June. Fruit very ornamental, and often gathered for household decoration.

Habitat.—Borders of woods and streams and along old fences, from Canada to Carolina and westward.

Part Used.—The bark—not official.

Constituents.—The bark has a sweetish, nauseous taste. Its chemical constituents are unknown.

Preparations.—None are official. Commonly used in decoction.

Medical Properties and Uses.—Climbing bittersweet is said to be diaphoretic, diuretic, alterative, and somewhat narcotic, but its reputation is chiefly in domestic practice, where the effects of large draughts of warm water are often attributed to some really inert substance which has been boiled with it. At any rate, if this plant really possesses valuable medicinal properties the fact is yet to be demonstrated.

Climbing or woody bittersweet should be carefully distinguished from the solanaceous plant (*Solanum Dulcamara*), also known as bittersweet, or herbaceous bittersweet.

EUONYMUS.—SPINDLE TREE.

Euonymus atropurpureus Jacquin.—*Wahoo, Burning Bush.*

Description.—Calyx: sepals commonly 4, united at the base. Corolla: petals as many as the sepals, roundish-obovate. Stamens as many as the sepals, inserted in the broad, flat, fleshy disk; filaments short. Ovary half enclosed by the disk; styles united. Fruit a 4-lobed, 4-celled capsule, each cell 1- to 2-seeded, the seeds nearly enclosed in the bright-red, succulent aril.

A shrub, 6 to 12 feet high, with somewhat quadrangular, straight branches. Leaves petiolate, ovate-oblong, pointed, finely serrate. Flowers dark purple, on peduncles 1 to 2 inches long, 5- to 7-flowered, appearing in June. The fruit matures in October.

Habitat.—In shady woods from Canada to Florida and westward.

Part Used.—The bark—*United States Pharmacopœia.*

Constituents.—To analysis euonymus has yielded, besides resins, starch, glucose, etc., a peculiar bitter neutral principle termed *euonymin*, whose therapeutic properties have not been investigated. The so-called *euonymin* of the eclectic practitioners is an impure resinous body, prepared by precipitating the alcoholic tincture by the addition of water.

Preparations.—Extractum euonymii—extract of euonymus.—*United States Pharmacopœia.* This is an efficient preparation. The bark imparts its virtues to both alcohol and water, and may be employed in tincture or decoction.

Medical Properties and Uses.—Euonymus is a mild and somewhat uncertain purgative, having probably some cholagogue action. Though chiefly employed in empirical practice, it is well thought of by many regular practitioners. There is little evidence, however, of its possessing properties of sufficient value to place it in rank with many other cathartics and purgatives of established reputation, and the efforts now being made to push it into popular favor are to be viewed as purely business enterprises, having little reference to the actual value of the drug.

SAPINDACEÆ.

Character of the Order.—Trees or shrubs, with alternate or opposite, simple or compound leaves. Flowers commonly irregular and unsymmetrical; sepals 4 or 5; petals 4 or 5, sometimes wanting; stamens 5 to 10, perigynous or hypogynous, inserted upon a fleshy disk; ovary 2- or 3-celled, each cell 1- or 2-ovuled.

A large order, chiefly tropical. Represented in North America by about a dozen genera only, one of which, Æsculus, comprises species of medicinal importance.

ÆSCULUS.—HORSE-CHESTNUT, BUCKEYE.

Character of the Genus.—Calyx campanulate, 5-lobed. Corolla: petals 4 to 5, expanded, more or less unequal. Stamens 6 to 8, commonly 7; filaments long and slender, often unequal. Ovary 3-celled, each cell 2-ovuled; style single. Fruit a large, smooth or prickly capsule. Trees or shrubs, with opposite, digitate leaves. Flowers in a terminal thyrse or dense panicle, often polygamous, most of them sterile.

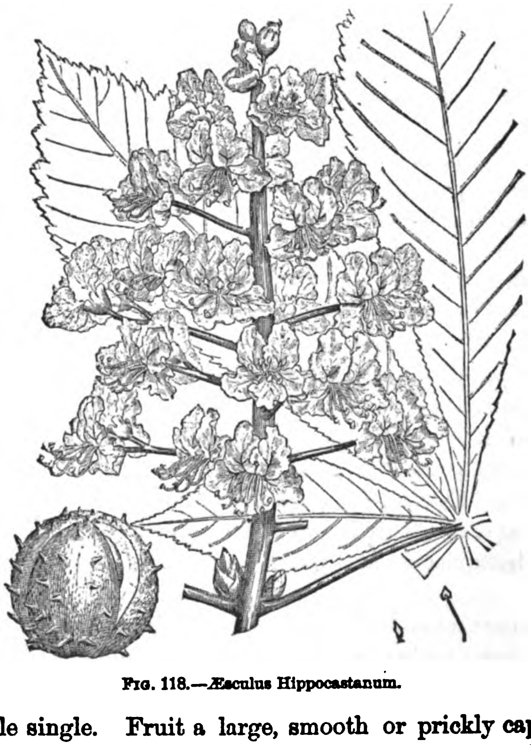


FIG. 118.—Æsculus Hippocastanum.

Æsculus Hippocastanum Linné.—*Horse-Chestnut.*

Description.—Calyx obtusely 5-toothed. Corolla: petals oblong, unguiculate, fringed and wavy, white with a small red or yellow spot above the claw. Stamens shorter than the petals, declined. Capsule roundish, prickly, 3-valved, 1- to 3-celled, containing 1 to 3 large, oblong, chestnut-brown seeds.

A medium-sized tree. Leaflets 7, obovate-lanceolate, acuminate, irregularly serrate. Flowers beautiful and showy, on jointed pedicels, appearing in June.

Habitat.—Introduced from the East and commonly cultivated for ornament; scarcely naturalized.

Æsculus glabra Willdenow.—*Ohio Buckeye.*

Description.—Corolla: petals 4, unequal, spreading, with claws as long as the calyx, pale yellow. Stamens 7, curved, much longer than the petals. Fruit nearly 1 inch in diameter, prickly.

A small, ill-scented tree. Leaflets 5, oval or oblong, acuminate, serrate. Flowers small, in loose thyrsöid panicles, appearing in May and June.

Habitat.—River banks in Western Pennsylvania, Virginia, Ohio, and Kentucky.

Æsculus Pavia Linné.—*Red Buckeye.*

Description.—Calyx tubular. Corolla: petals 4, very unequal, connivent, red. Stamens 6 to 8, about as long as the petals. Fruit smooth.

A shrub or small tree. Leaflets 5 to 7, oblong-lanceolate, cuneate at the base, slightly acuminate. Flowers large, in loose thyrsoid racemes, appearing in April and May.

Habitat.—Mountains of Virginia to Georgia and westward. Most commonly a shrub, 3 to 10 feet high, but near the mountains a small tree.

Parts Used.—The bark and the seeds—not official.

Constituents.—The most important constituent thus far discovered in any plant of this genus is a principle termed *æsculin*, which was obtained from the bark of the horse-chestnut. The rind of the seeds also contains some æsculin. The seeds of all the species abound in starch, mixed, however, with a bitter and acrid substance, which can only be removed by long washing. In the case of the red buckeye this has been shown to be a glucoside, possessed of poisonous properties.

Preparations.—None are official. The virtues of the bark are imparted to both alcohol and water. A commercial article erroneously termed *æsculin* is prepared by precipitating the alcoholic tincture with water. It is said to be an efficient preparation.

Medical Properties and Uses.—Horse-chestnut bark is tonic and astringent, and formerly had some reputation in Europe as an antiperiodic. It has been used successfully in some cases of intermittents which had previously resisted quinine, but in general it is far less efficacious than the latter. It is probable that the bark of all species of the genus possesses similar properties, differing only in degree. The poisonous glucoside found in the seeds of the red buckeye is also likely to be present in those of other species. It is of a narcotic character and said to be about one-third of the strength of opium. In the Southern States the seeds of this species, crushed to a pulp, are employed to stupefy fish and thus render their capture easy, in the same manner as the seeds of Cocculus Indicus are used for like purposes.

POLYGALACEÆ.

Character of the Order.—Plants with alternate or opposite, exstipulate leaves. Flowers very irregular; sepals usually 5; petals 3; stamens 4 to 8, monadelphous or diadelphous; anthers 1-celled, opening by a pore at the top; ovary 2-celled, each cell 1-ovuled. Fruit 2-celled, 2-seeded.

An order of few genera but many species. Represented in North America by three genera, only one of which comprises medicinal species.

POLYGALA.—MILKWORT.

Character of the Genus.—Calyx: sepals 5, persistent, unequal, the three outer smaller, the two inner (lateral) larger and petaloid. Corolla: petals 3, unequal, the middle (anterior) one larger, and usually crested at the apex; all of them more or less united. Stamens 8, rarely 6, their filaments united below into a split tube or into two equal sets, and more or less cohering with the claws of the petals also. Ovary 2-celled, each cell 1-ovuled; style elongate, curved. Fruit a small 2-seeded pod; seeds carunculate.

Small herbs, in temperate climates, with alternate or whorled leaves. Many of the North American species are supposed to possess medicinal virtues, but only one—*Polygala Senega*—has an established reputation. The genus as a whole probably deserves further investigation.

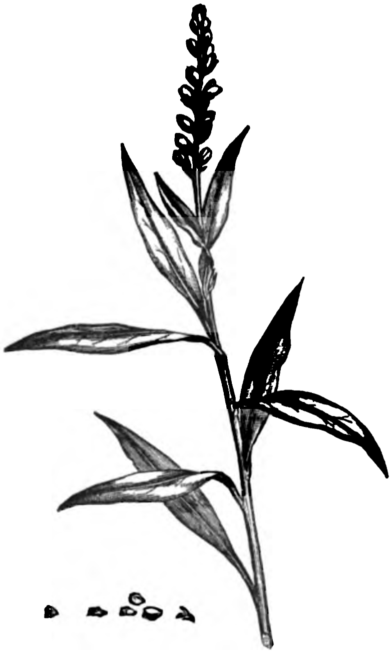


FIG. 119.—Polygala Senega.

Polygala Senega Linné.—*Seneca Snakeroot, Senega, Seneka.*

Description.—Calyx: the two inner sepals, or wings, roundish-ovate, white, slightly veined. Corolla small, closed, lateral petals obtuse, the anterior, or keel, crested. Capsule obcordate, compressed, invested with the persistent calyx.

A small herbaceous perennial. Root with a hard, knotty crown and tortuous branches. Stems several, 6 to 12 inches high, smooth, simple, occasionally tinged with red. Leaves numerous, alternate, lanceolate or oblong-lanceolate, 1 to 2 inches long, with rough margins. Flowers in dense spikes, 1 to 1½ inch long, appearing in May and June.

Habitat.—In dry, rocky woods from Western New England to North Carolina and westward; most abundant in the South and West.

Polygala polygama Walter (*P. rubella* Willdenow).—*Bitter Polygala.*

Description.—Calyx: wings broadly obovate, spreading, longer than the petals. Corolla: keel conspicuously crested. Capsule oblong, emarginate.

A small biennial. Stems numerous, mostly simple, leafy, 6 to 9 inches high. Leaves alternate, oblanceolate or oblong, 1 inch long. Flowers in terminal racemes, deep rose-color or purplish. There are also produced radical racemes of inconspicuous but fertile flowers, which are prostrate upon the ground, or subterranean.

Habitat.—Dry, sandy soil from Canada to Florida and westward. Very common.

Parts Used.—The root of *P. Senega* is official under the name of senega —*United States Pharmacopœia.* Both the root and herb of *P. polygama* (*P. rubella*) were formerly official, but have been discarded.

Constituents.—Senega has a peculiar odor, and a taste which is, at first, sweetish but afterward pungent and acrid. Its most important constituent is a peculiar acrid principle termed *senegin*, or *polygalic acid*, which is believed to be closely analogous to saponin, a principle existing in *Saponaria officinalis* and *Quillaia bark*. From P. polygama (*P. rubella*) has been obtained a crystalline compound termed *polygalamarin*, which has a very bitter taste, and foams considerably when agitated with water, in this respect resembling saponin.

Preparations.—Of senega: Abstractum senegæ—abstract of senega; extractum senegæ fluidum—fluid extract of senegæ; syrupus senegæ—syrup of senega; a constituent of syrupus scillæ compositus—compound syrup of squill.—*United States Pharmacopœia.* Of P. polygama there are no official preparations. Both species yield their virtues to water and to diluted alcohol.

Medical Properties and Uses.—Senega in small or medium doses is diaphoretic, diuretic, and expectorant; in large doses, emetic and cathartic. In practice it is chiefly used as a stimulating expectorant in the later stages of bronchial and pulmonary affections after active inflammatory symptoms have been subdued. Its emetic and purgative action has been found useful in rheumatism and dropsy, but other agents are more eligible. It has also some reputation as an emmenagogue.

Of P. polygama there is little to be said. It is believed to possess properties similar to those of *P. amara* of Europe, but as this plant is no longer official there its properties cannot be considered of much value. All species of the genus are more or less bitter, and probably possess, if nothing else, mild tonic properties.

LEGUMINOSÆ.

Character of the Order.—Herbs, shrubs, or trees, with alternate, stipulate, generally compound leaves. Flowers papilionaceous, sometimes regular; calyx 5-parted, the odd segment inferior; petals 5, the odd one superior; stamens 10, rarely 5 or indefinite, monadelphous or diadelphous, sometimes distinct, commonly perigynous; ovary simple, 1-celled, 1- to many-ovuled. Fruit a 1- to many-seeded legume.

A very large order of plants, occurring in all parts of the globe, but most abundantly in the tropics. It has been divided into three sub-orders, namely, *Papilionaceæ*, *Cæsalpinieæ*, and *Mimoseæ*. To the first-named sub-order belong nearly all important leguminous plants of temperate regions, and, with the single exception of *Cassia*—belonging to the sub-order *Cæsalpinieæ*—all North American species of medicinal importance.

PAPILIONACEÆ.

Character of the Sub-Order.—Flowers papilionaceous; sepals 5, more or less united, often unequally so; petals 5, irregular, imbricate, the upper one larger than the others and usually enclosing them in the bud; stamens 10, rarely 5, inserted with the petals, monadelphous, diadelphous, or sometimes distinct; when diadelphous, usually with nine in one set and one in the other. Ovary normally 1-celled, sometimes becoming 2-celled, or transversely many-celled by development of partitions after flowering. Flowers perfect, solitary and axillary, or in spikes, racemes, or panicles.

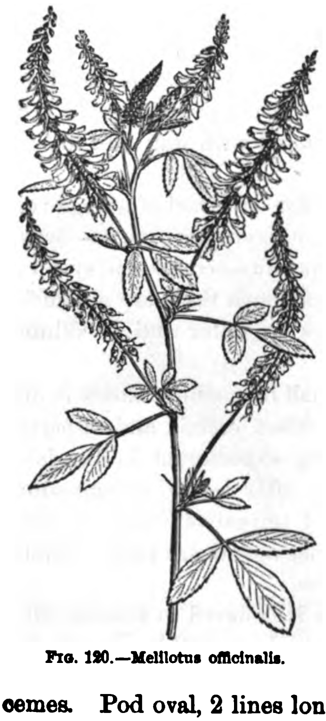


FIG. 120.—Melilotus officinalis.

MELILOTUS.—MELILOT.

Character of the Genus.—Calyx 5-toothed. Corolla: petals free from the stamen-tube, deciduous, the keel blunt. Stamens diadelphous, the upper one free. Pods short, straight, thick, 1- or few-seeded, indehiscent.

Annual or biennial herbs, with trifoliate leaves, and flowers in spiked racemes.

Melilotus officinalis Willdenow.—*Yellow Melilot.*

Description.—Flowers numerous, 2 to 3 lines long, bright yellow, in long axillary racemes. Pod oval, 2 lines long, obtuse or pointed.

An erect annual or biennial, 2 to 4 feet high, branched, glabrous. Leaves scattered, on long petioles; leaflets of the lower leaves nearly orbicular, of the upper narrow, often linear.

Habitat.—Cultivated and waste places. Introduced from Europe.

Melilotus alba Lambert.—*White Melilot.*

Description.—Very closely resembling the preceding, except that it has white flowers and is a somewhat larger plant.

Habitat.—Cultivated and waste places. Introduced from Europe.

Part Used.—The herb—not official.

Constituents.—These plants in drying have a fragrant odor, due to the presence of *coumarin*—the important constituent of Tonka beans; and they are only interesting on this account.

Preparations.—There are none.

Medical Properties and Uses.—Yet to be determined. That coumarin exerts a decided influence upon the heart is well known, and hence all plants in which this principle is found are not without interest, especially those which are or are likely to be used as adulterants of smoking tobacco. There is good reason for believing that many of the ill effects of cigarette-smoking, so common among our boys and young men, are due, not to the tobacco, but to the presence of adulterants containing coumarin. (See also *Liatris odoratissima.*)

PSORALEA.

Character of the Genus.—Calyx deeply 5-cleft, the lower lobe longest. Stamens diadelphous, or occasionally monadelphous. Pod about the length of the calyx, indehiscent, 1-seeded, sometimes beaked.

Shrubs or herbaceous perennials, commonly dotted with prominent glands or points. Leaves 3- to 5-foliate. Flowers in spikes or racemes, white, blue, or purple.

Psoralea melilotoides Michaux.

Description.—Calyx: teeth triangular-ovate. Pod orbicular, transversely wrinkled. Herbaceous, sparingly pubescent, glandular, 1 to 2 feet high. Leaves 3-foliate; leaflets oblong-lanceolate, dotted, about 2 inches long. Spikes oblong, on peduncles three to four times as long as the leaves; flowers one-fourth inch long, usually in pairs on short pedicels, appearing in May and June.

Habitat.—Dry soil, Ohio, Illinois, and westward.

Psoralea esculenta Pursh.

Description.—Calyx: teeth lanceolate, a little shorter than the corolla. Pods beaked. Herbaceous, hairy, about 1 foot high. Root thick and fusiform, about the size of a walnut. Leaves 5-foliate, slightly dotted; leaflets lanceolate. Spikes dense, on long peduncles; flowers pale blue, one-half inch long, appearing in June or July.

Habitat.—High plains from Wisconsin westward.

Parts Used.—The leaves and root—not official.

Constituents.—Resin and volatile oil.

Preparations.—None are official. Alcohol extracts the most important constituents of the plants.

Medical Properties and Uses.—The above-described, as well as several other indigenous species of the genus, have been used to a limited extent as remedial agents, but not sufficiently to establish their character. All of them have a pungent, bitter, and somewhat aromatic taste, and are doubtless entitled to a place among the feebler aromatic bitter tonics. The fusiform root of *P. esculenta* is somewhat farinaceous, and was formerly eaten by the Indians; when roasted, Pursh says, they are similar to yams. The early Canadian *voyageurs* gave the plant the name *pomme de prairie* or *pomme blanche.*

ROBINIA.—Locust Tree.

Robinia Pseudacacia Linné.—*Common Locust.*

Description.—Calyx short, 5-toothed, slightly 2-lipped. Corolla: standard large, rounded, reflexed; wing and keel nearly as long. Stamens diadelphous. Pod about 3 inches long, flat, 5- to 6-seeded.

In its native habitat a large tree, 70 to 80 feet high and 3 to 4 feet in diameter; farther north it seldom attains half this size. Leaves unequally pinnate; leaflets 9 to 13, sessile, oval, thin, smooth and shining. Flowers numerous, in loose pendulous racemes, white, and very fragrant; they appear in June.

Habitat.—Southern Pennsylvania to Illinois and southward. It is cultivated for ornament and for its valuable timber in all parts of the country, and is also largely grown in Europe.

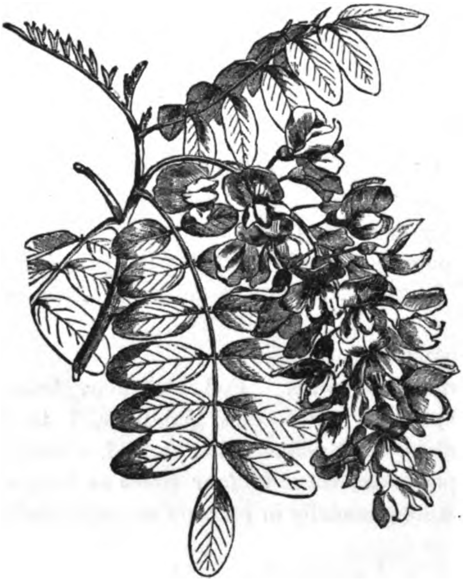


Fig. 121.—Robinia Pseudacacia.

Parts Used.—The leaves, flowers, bark, and root—not official.

Constituents.—The bark has yielded to analysis *asparagin* and a peculiar glucoside termed *robinin.*

Preparations.—The bark has been employed in decoction, the leaves in powder, and the flowers in the form of a syrup.

Medical Properties and Uses.—These are altogether problematical. The bark is said to be tonic, emetic, and cathartic; the leaves emetic; and the flowers mildly narcotic. Poisonous effects have been produced in children from eating the root, the symptoms resembling those of belladonna. The flowers, to the author's own knowledge, are often eaten with impunity.

TEPHROSIA.—HOARY PEA.

Tephrosia Virginiana Persoon.—*Goat's Rue, Turkey Pea, Catgut.*

Description.—Calyx about equally 5-cleft. Corolla: standard large, rounded, reflexed; keel petals broad. Stamens monadelphous or diadelphous. Pods about 2 inches long, flat, several-seeded. An herbaceous perennial. Stems numerous, erect, simple, leafy at the top, silky pubescent. Leaves unequally pinnate; leaflets 17 to 29, linear-oblong, mucronate. Flowers large and numerous, in dense oblong racemes, yellowish-white marked with purple, appearing in June or July.

Habitat.—Dry, sandy soil, Canada to Florida and westward.

Part Used.—The root—not official.

Constituents.—Unknown.

Preparations.—Used only in decoction.

Medical Properties and Uses.—The root of this plant is said to have been used by the Indians as a vermifuge before the settlement of the country by the whites, and it is now used in some parts of the United States for the same purpose. Its action is said to resemble that of spigelia and to be quite as efficient.

BAPTISIA.—FALSE INDIGO.

Baptisia tinctoria Robert Brown.—*Wild Indigo.*

Description.—Calyx 4- to 5-toothed. Corolla: standard not longer than the wings, reflexed; wings and keel petals straight. Stamens distinct. Pods oval-globose, on a stalk longer than the calyx, several-seeded. An herbaceous perennial. Stems smooth and slender, freely branched, 2 to 3 feet high. Leaves palmately trifoliate; leaflets rounded, obovate-wedge-shaped, three-quarters of an inch long. Flowers yellow, in short terminal racemes, appearing from June to August.

Habitat.—Dry, sandy soil, Canada to Florida and westward.

Part Used.—The root—not official.

Constituents.—The most recent analysis of this plant demonstrates the presence of a peculiar alkaloid, as yet unnamed. The so-called *baptisin* of the eclectics is an impure resinous substance obtained from the alcoholic tincture by precipitation with water.

Preparations.—None are official. A tincture and a fluid extract occur as commercial preparations, and are said to be efficient. The author has employed a tincture made from the fresh bark of the root.

Medical Properties and Uses.—Early in this century Dr. Thacher highly recommended an infusion or decoction of this plant as an antiseptic application to ill-conditioned ulcers, and as a gargle in malignant and scarlatinal sore throat. Other physicians considered its internal use efficacious in typhus (typhoid ?) and malignant scarlet fevers. In more recent times it has gained a great reputation among homœopathic and eclectic practitioners, especially in typhoid fever. Some years ago the author experimented with it in this disease, with what he believed to be satisfactory results. (See "Trans. Med. Soc. State of New York," 1880.) Further experiments have not altogether justified the conclusions then arrived at; still the drug does in some instances appear to exert a favorable influence, and is worthy of further investigation.

CASSIA.—SENNA.

Cassia Marilandica Linné.—*American Senna.*

Description.—Calyx: sepals 5, scarcely united at the base, colored, deciduous. Corolla: petals 5, nearly equal, spreading. Stamens 10, rarely 5, distinct, the three upper commonly abortive; anthers opening by two pores at the top. Pod 2 to 4 inches long, linear, compressed, slightly curved, at first hairy, ultimately nearly glabrous, many-celled with transverse partitions, many-seeded.

An herbaceous perennial. Stems erect, branching, 3 to 4 feet high. Leaves alternate, equally pinnate; leaflets in 6 to 9 pairs, ovate-oblong, mucronate, 1 to 2 inches long, one-half inch wide. Flowers bright orange-yellow, in short axillary racemes, on the upper part of the stem; they are produced during July and August.

Habitat.—Common in alluvial soil from New England and New York southward and westward.

Part Used.—The leaflets—formerly official; dropped from the last edition of the United States Pharmacopœia.

Constituents.—A satisfactory analysis of this plant is yet to be made. One analyst has found in it, in addition to the ordinary vegetable principles, a complex substance resembling the so-called *cathartin* of imported senna.

Preparations.—None are official. It yields its virtues to water, and is commonly administered in infusion.

Medical Properties and Uses.—The action of American senna is similar to that of the African drug, though it is much less efficient, a dose one-third or one-half larger being required to produce the same effect. On this account the imported article is generally preferred.

Other species of cassia, indigenous or introduced, are said to possess medicinal activity, but are not sufficiently employed to require further notice here.

ROSACEÆ.

Character of the Order.—Herbs, shrubs, or trees, with alternate, stipulate leaves and regular flowers. Sepals commonly 5, rarely less or more, united at the base, often appearing double by a row of bractlets outside; petals as many as the sepals, rarely wanting, inserted with the stamens upon the calyx; stamens numerous, rarely few; pistil 1 or many, distinct, or in the pear tribe united and combined with the calyx-tube. Fruits exceedingly varied.

A very large and important order, represented in all parts of the globe. Very many of the species produce valuable fruits, and but few are possessed of deleterious properties. Authorities differ widely as to the proper limitations of the order. Torrey and Gray ("Flora of North America") include in it four sub-orders, namely: *Chrysobalaneæ*, *Amygdaleæ*, *Rosaceæ*, and *Pomeæ*. The first-named sub-order comprises no medicinal species.

AMYGDALEÆ.

Character of the Sub-Order.—Calyx entirely free from the (usually) solitary ovary, deciduous. Style terminal or nearly so. Fruit a drupe (stone-fruit), 1-seeded or rarely 2-seeded. Trees or shrubs, with simple leaves, the bark exuding gum, and the bark, leaves, and kernels yielding the peculiar flavor of prussic acid (Gray). This section comprises all the plants of the order which possess noxious or poisonous properties, and in all the poisonous principle is the same—prussic acid—not existing as such in the leaves, bark, and kernels, but produced, as will be seen later on, by infusion in water. It is represented in North America by the genus

PRUNUS.—Plum and Cherry.

Character of the Genus.—Calyx 5-cleft, urn-shaped, bell-shaped, or tubular-obconical, deciduous after flowering. Petals 5, distinct, spreading, inserted with the stamens upon the calyx-tube. Stamens 15 to 20. Ovary solitary, 2-ovuled. Fruit fleshy, with a bony stone. Commonly small trees or shrubs, with edible fruit.

Prunus serotina Ehrhart (*Cerasus serotina* Loiseleur, *Cerasus Virginiana* Michaux, *Prunus Virginiana* Miller).—*Wild Cherry, Wild Black Cherry.*

Description.—Petals small, obovate, quickly deciduous. Fruit about the size of a pea, nearly black when ripe, and of a slightly bitter taste.

In favorable locations a large forest tree. Leaves 5 to 6 inches long, lanceolate-oblong, acuminate, serrate with short incurved teeth, somewhat coriaceous, dark shining green. Flowers in long terminal racemes, appearing in June after the tree is in full leaf.

Habitat.—Canada to Florida and westward; very common.

Prunus Virginiana Linné (*Prunus Canadensis* Marshall, *Prunus serotina* Poir, *Cerasus Virginiana* Loiseleur, *Cerasus serotina* Hooker).—*Choke-Cherry.*

Description.—Petals roundish. Fruit about the size of a pea, dark red when fully ripe, and of an extremely astringent taste.

A shrub or small tree, with a grayish bark. Leaves thin and membranous, 2 to 3 inches long, broadly oval, oblong or ovate, abruptly pointed, very sharply and often doubly serrate. Flowers in loose, short racemes terminating the branches, appearing in May after the leaves are considerably developed.

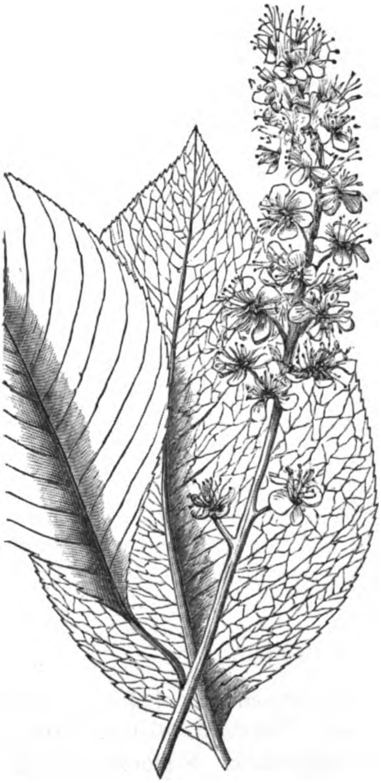


Fig. 122.—Prunus serotina Ehrhart (*Cerasu serotina*)

Habitat.—From Canada to the Gulf of Mexico and westward; everywhere common.

Part used.—The bark of Prunus serotina Ehrhart—official name, Prunus Virginiana—wild cherry—*United States Pharmacopœia.* The bark of the other species is said to be fully as efficient. As will be seen by reference to the synonomy of the two species, there has been great confusion among botanists in their nomenclature; hence the wild cherry of the Pharmacopœia bears as its official name the proper, and at present generally accepted, title belonging to choke-cherry.

Constituents.—Wild cherry bark contains tannic and gallic acids, resin, starch, and other common vegetable principles, and by distillation yields a peculiar volatile oil resembling the volatile oil of bitter almonds, containing hydrocyanic acid. The acid does not pre-exist in the bark, but is formed by the action of a proteid upon *amygdalin,* an amorphous or crystalline principle present in all plants of this sub-order. Amygdalin is not poisonous itself, nor is the proteid substance. Moreover, the latter is coagulated by heat and thus rendered inert; hence in order to obtain hydrocyanic acid from wild cherry, the bark must first be subjected to the action of cold water. A peculiar bitter principle is also present in wild cherry to which certain of the medicinal properties of the bark are due.

Preparations.—Extractum pruni virginianæ fluidum—fluid extract of wild cherry; infusum pruni virginianæ—infusion of wild cherry; syrupus pruni virginianæ—syrup of wild cherry.—*United States Pharmacopœia.*

Medical Properties and Uses.—Wild cherry is tonic, astringent, and sedative. Its tonic virtues doubtless reside in the bitter principle mentioned above, and its astringent properties are due to the tannic and gallic acids which it contains, while its sedative influence depends entirely upon the hydrocyanic acid generated by its infusion in water. It is employed chiefly in pulmonary consumption, and not unfrequently with very beneficial effects. Under its use the appetite improves, and both the cough and expectoration are diminished. As the percentage of hydrocyanic acid present in the infusion is very small, the dose, to produce a decided sedative effect, must necessarily be quite large, but as its bitterness is also of a mild character, large doses are generally borne without inconvenience. It is sometimes employed in conditions of simple debility and in convalescence, but here chiefly for its tonic effect. The infusion, made with cold water, is by far the best form of administration.

ROSACEÆ.

Character of the Sub-Order.—Calyx entirely free from the ovaries, though sometimes enclosing them in its tube, commonly persistent. Stamens few or many. Pistils few or many, distinct, rarely solitary.

This section, the largest of the order, comprises many of the small fruits in common cultivation, as well as numerous plants cultivated for ornament. Many plants of the sub-order possess astringent properties.

SPIRÆA.—MEADOW-SWEET.

Spiræa tomentosa Linné.—*Hardhack, Steeplebush.*

Description.—Calyx 5-cleft, short, persistent. Corolla: petals 5, obovate, imbricate in the bud. Stamens 10 to 50. Pistils 5, distinct. Pods few-seeded.

A small shrub, 2 to 3 feet high, somewhat branched, brittle, clothed with a woolly pubescence which easily rubs off. Leaves 1 to 2 inches long, ovate, unequally serrate, deep green above, thickly coated with a rusty pubescence beneath. Flowers small, numerous, rose-colored, rarely white, in a beautiful elongated panicle, appearing in July and August.

Habitat.—In low grounds and swampy places from Canada to Georgia and westward.

Parts Used.—The leaves and bark of both the stem and the root—not official.

Constituents.—Tannic and gallic acids.

Preparations.—None are official. A decoction is usually employed. Solid and fluid extracts occur as commercial articles.

Medical Properties and Uses.—Hardhack and other species of spiræa, both indigenous and exotic, have been used considerably as astringents, both internally and topically. Their action appears to differ in no way from that of other simple vegetable astringents.

GILLENIA.—Indian Physic.

Gillenia trifoliata Moench.—*Indian Physic.*

Description.—Calyx tubular-campanulate, 5-toothed, the teeth somewhat reflexed. Corolla: petals 5, unequal, linear-lanceolate, the two upper somewhat separated from the three lower, inserted in the throat of the calyx. Stamens 10 to 20, included. Pods 5, included, 2- to 4-seeded.

An herbaceous perennial. Stems several from one root, 1 to 2 feet high, erect, slender, flexuous, smooth, commonly tinged with red, and considerably branched. Leaves alternate, trifoliate; leaflets ovate, lanceolate, acuminate, sharply serrate. The upper leaf is often single. Flowers few, nodding, rose-colored or white, forming a loose paniculate corymb, appearing in July.

Habitat.—Canada and Western New York to Georgia.

Part Used.—The root—not official.

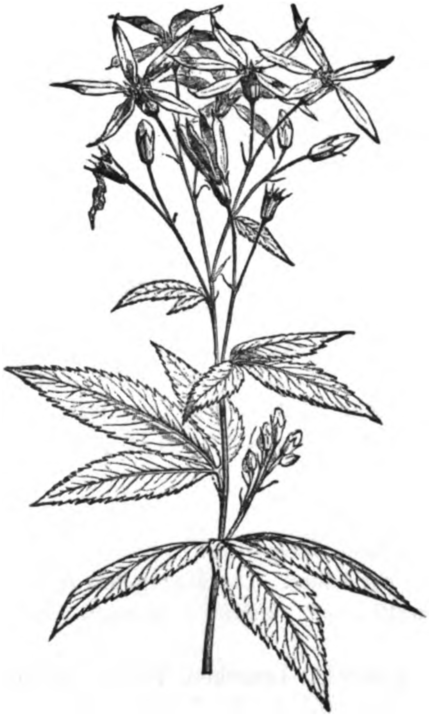


FIG. 123.—Gillenia trifoliata.

Constituents. — In addition to the ordinary vegetable principles, such as starch, gum, resin, tannin, etc., gillenia possesses a peculiar bitter principle, termed *gillenin*, to which its therapeutic properties are due. Gillenin has been obtained in the form of a whitish powder, soluble in water, alcohol, ether, and dilute acids. It has a very bitter taste and is an active emetic.

Preparations.—None are official. The root is commonly administered in powder. A fluid extract occurs as a commercial article.

Medical Properties and Uses.—Gillenia was formerly used, especially in domestic practice, as an emetic. It is said to act like ipecacuanha, though less efficiently. In very small doses it is said to exert a tonic influence upon the stomach similar to that of ipecacuanha when used in like manner.

Gillenia stipulaceæ Nuttall, a species closely resembling the preceding, and growing in similar situations, is possessed of identical properties. Both species were formerly official, but have been dropped from the Pharmacopœia, since they are, at best, but poor substitutes for ipecacuanha.

AGRIMONIA.—AGRIMONY.

Agrimonia Eupatoria Linné.—*Agrimony.*

Description.—Calyx turbinate, contracted at the throat, 5-cleft, armed with hooked bristles. Corolla: petals 5, twice as long as the calyx, yellow. Stamens 12 to 15, inserted with the petals in the throat of the calyx. Ovaries 2; styles terminal. Fruit 2-achenia inclosed in the persistent, indurated calyx.

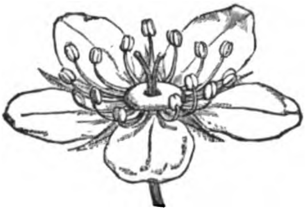


Fig. 124.—Agrimonia Eupatoria. Flower enlarged.

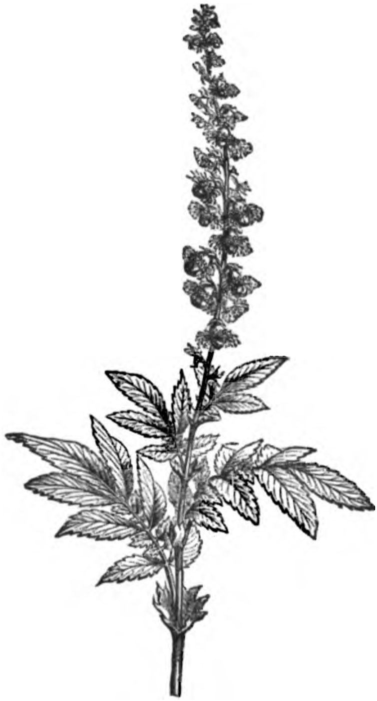


Fig. 126.—Agrimonia Eupatoria.

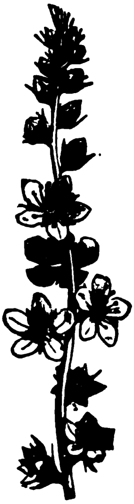


Fig. 125.—Agrimonia Eupatoria. Flowers natural size.

An herbaceous perennial, 2 to 4 feet high. Leaves interruptedly pinnate; leaflets 5 to 7, with minute ones intermixed, oblong-obovate, coarsely toothed. Flowers in slender, spiked racemes, appearing from July to September.

Habitat.—Borders of woods from Canada to Florida and westward. Common in Europe also.

Part Used.—The whole plant—not official.

Constituents.—The only constituent thus far discovered in agrimony of therapeutic importance is tannin, which exists in the proportion of less than five per cent.

Preparations.—None are official—a decoction or infusion is efficient.

Medical Properties and Uses.—Agrimonia has been used considerably in domestic practice in cases requiring simple vegetable astringents.

GEUM.—AVENS.

Geum rivale Linné.—*Water Avens.*

Description.—Calyx deeply 5-cleft, the segments erect or spreading, purplish. Corolla: petals 5, broadly obovate, emarginate, abruptly narrowed into a claw about as long as the calyx, light purplish-orange. Stamens numerous. Achenia numerous, gathered in a head upon a dry, conical receptacle; styles articulated and bent in the middle, the upper part plumose, the lower glabrous.

An herbaceous perennial. Stems nearly simple, 1 to 3 feet high, retrorsely pubescent. Radical leaves lyrate and interruptedly pinnate; those of the stem trifoliate or trilobed. Flowers few, large, nodding, appearing in May and June.

Habitat.—Bogs and wet meadows from Pennsylvania northward and westward. Common in Europe also.

Parts Used.—The rhizome and rootlets—not official.

Constituents.—This plant has not been analyzed, but it is believed to possess constituents similar to those of *Geum urbanum*, a closely allied European plant, which contains volatile oil, tannin, and a bitter principle.

Preparations.—None are official. Boiling water extracts its virtues.

Medical Properties and Uses.—Water avens is tonic and astringent. It has been used chiefly in relaxation of the mucous membranes.

POTENTILLA.—CINQUE-FOIL.

Potentilla Canadensis Linné.—*Common Cinque-Foil, Five-Finger.*

Description.—Calyx flat, deeply 5-cleft, with 5 bractlets alternating with the segments, thus appearing 10-cleft. Corolla: petals 5, longer than the calyx, broadly obovate or obcordate, yellow. Stamens numerous. Achenia numerous, gathered in a head on a dry receptacle.

A small annual or biennial, with decumbent, prostrate, or creeping stems, producing runners in summer. Leaves 5-foliate; leaflets obovate-wedge-shaped, cut-toothed at the apex. Flowers solitary on long axillary peduncles, appearing throughout the summer.

Habitat.—In dry soil from Canada to Georgia and westward; everywhere common.

Part Used.—The whole plant—not official.

Constituents.—Unknown.

Preparations.—None are official or commercial. Usually administered in decoction or infusion.

Medical Properties and Uses.—Cinque-foil and several other species of the genus possess mild astringent properties, and have been used, chiefly in domestic practice, in diarrhœa, dysentery, leucorrhœa, etc.

RUBUS.—BRAMBLE.

Character of the Genus.—Calyx 5-parted, without bractlets. Petals 5, deciduous. Stamens numerous, inserted into the border of the disk. Achenia numerous, pulpy and drupaceous, aggregated upon a conical or cylindrical spongy or succulent receptacle, persistent or deciduous.

Perennial shrubby or suffruticose plants, with erect or procumbent, mostly prickly and biennial stems. Leaves pinnately or pedately compound, or simple.

Rubus villosus Aiton.—*Common High Blackberry.*

Description.—Calyx: teeth linear-acuminate. Corolla: petals obovate-oblong, spreading, much longer than the calyx, white. Fruit, composed of aggregated drupes, not separating from the succulent, elongated receptacle, one-half to 1 inch long, one-fourth to one-half inch in diameter, black, sweet, and juicy.

A shrubby perennial. Stems numerous, 1 to 6 feet high, upright or reclining, furrowed, armed with strong recurved prickles. Leaves 3-foliate or pedately 5-foliate; leaflets ovate or oblong-ovate, mostly acuminate, doubly or unequally serrate, the terminal one somewhat cordate, petiolate. Flowers racemose, numerous, appearing in May and June; the fruit ripens in August and September.

Habitat.—Common everywhere along the borders of woods, old fences, and in clearings. The bushes vary greatly in size and general appearance, according to the circumstances of their growth. The fruit also is variable in respect of size, succulence, and flavor.

Rubus Canadensis Linné.—*Low Blackberry, Running Blackberry, Dewberry.*

Description.—Calyx: teeth mucronate. Corolla: petals twice the length of the calyx, white. Fruit similar to the preceding but shorter and thicker, the individual drupes being much less numerous but larger.

A low, trailing shrubby plant. Stems at first ascending but ultimately trailing, and rooting when long in contact with the earth, less prickly than the preceding. Leaves 3-foliate, or pedately 5- to 7-foliate; leaflets oval or ovate-lanceolate, mostly acuminate, thin, nearly smooth, sharply cut-serrate. Flowers racemose, appearing in May; the fruit ripens in July and August.

Habitat.—Rocky hills, and old, neglected fields. Widely distributed, but much less common than the preceding.

Rubus trivialis Michaux.—*Low-Bush Blackberry.*

Description.—Calyx: teeth reflexed. Corolla: petals broadly obovate, more than twice the length of the calyx, white. Fruit large.

Stem shrubby, procumbent, armed with bristles and prickles. Leaves 3-foliate or pedately 5-foliate, evergreen, coriaceous, nearly glabrous; leaflets ovate-oblong or lanceolate, sharply serrate. Peduncles 1- to 3-flowered; flowers large, appearing in March; the fruit ripens in May.

Habitat.—In sandy soil from Virginia to Florida and westward.

Rubus strigosus Michaux.—*Red Raspberry.*

Description.—Calyx spreading. Corolla: petals erect, about as long as the calyx, white. Fruit an aggregation of drupes, which falls from the spongy, conical receptacle at maturity; light red, sweet and juicy.

Stems biennial, upright, armed with stiff bristles. Leaves 3- to 5-foliate; leaflets oblong-ovate, acuminate, cut-serrate, whitish-downy underneath. Peduncles axillary and terminal; the flowers appear from June forward, and the fruit ripens throughout the summer.

Habitat.—Common everywhere along the borders of woods and in old fields.

Rubus occidentalis Linné.—*Black Raspberry, Thimbleberry.*

Description.—Calyx: teeth reflexed. Corolla: petals shorter than the sepals, white. Fruit similar to the preceding, but composed of smaller drupes, purple-black, sweet and juicy.

Stems biennial, recurved, armed with hooked prickles. Leaves 3-foliate, rarely 5-foliate; leaflets ovate, acuminate, doubly serrate, whitish-downy underneath. Flowers in axillary and terminal clusters, appearing in May; the fruit ripens in June and July.

Habitat.—Common along old fences and in clearings from Canada to Georgia and westward.

Parts Used.—The bark of the root of *R. villosus, R. Canadensis,* and *R. trivialis*—official name: *Rubus*—*United States Pharmacopœia.* The fruit of *R. strigosus* and *R. occidentalis* is permitted by the Pharmacopœia to be used instead of that of the official species, *R. Idæus* Linné.

Constituents.—Blackberry root contains tannin as its chief and most important constituent.

Raspberries and blackberries are among the most important of indigenous small fruits. Though possessed of no strictly medicinal virtues, the former are used in the preparation of a syrup which is employed as a pleasant vehicle.

Preparations.—Of blackberry root: Extractum rubi fluidum—fluid extract of rubus; syrupus rubi—syrup of rubus. Of Rubus Idæus (or *R. strigosus* or *R. occidentalis*): Syrupus rubi idæi—syrup of raspberry.—*United States Pharmacopœia.*

Medical Properties and Uses.—Blackberry is used as a mild astringent chiefly in the diarrhœas of infants and young children. It is generally well borne by the stomach, and though less efficient than many other drugs which are used for the same purposes, may often be employed with excellent results.

Raspberries, in the form of the official syrup, are used only as a vehicle.

SAXIFRAGACEÆ.

A large order of herbs, shrubs, or trees, whose limits are not altogether settled. As the medicinal species of the order indigenous to North America are few in number and belong to different, well-characterized sub-orders, it is more convenient to study them under the latter than to attempt, from the few species examined, to characterize the entire order.

HYDRANGEÆ.

Character of the Sub-Order.—Shrubs or trees, with opposite, simple, exstipulate leaves. Flowers in cymes, the central ones complete, the outer ones with large petals, and often barren. Calyx more or less adherent to the ovary, 4- to 6-toothed. Petals 4 to 6, deciduous. Stamens 8 to 12, in two rows, or numerous, attached to the calyx. Ovary of 2 to 5 carpels united; styles 2 to 5. Fruit a many-seeded capsule, crowned with the persistent styles.

HYDRANGEA.

Hydrangea arborescens Linné.—*Wild Hydrangea.*

Description.—Calyx-tube hemispherical, 8- to 10-ribbed, coherent with the ovary, the limb 4- to 5-toothed. Petals ovate, valvate in the bud. Stamens 8 to 10, filiform. Capsule 2-celled, many-seeded, crowned with the persistent styles.

A shrub, 4 to 8 feet high. Leaves 3 to 6 inches long, ovate, rarely cordate, acuminate, serrate, green both sides. Cymes flat; the marginal flowers usually sterile and radiant, consisting of a flat, dilated, and colored calyx; sometimes all fertile.

Habitat.—Rocky banks from New Jersey to the mountains of Georgia and westward to Illinois.

Part Used.—The root—not official.

Constituents.—Analysis has not as yet yielded any results which throw light upon the asserted therapeutic properties of this plant.

Preparations.—None are official. A fluid extract occurs as a commercial article.

Medical Properties and Uses.—Hydrangea is said to exert a specific action upon the bladder in calculous affections in their earlier stages, effecting the removal of the deposits and moderating the pain incident to their passage—all of which may be true, but further evidence is desirable.

SAXIFRAGEÆ.

Character of the Sub-Order.—Herbs, with alternate, or rarely opposite, exstipulate leaves. Calyx 4- to 5-toothed. Petals imbricated, or rarely convoluted in the bud, deciduous or withering-persistent. Stamens as many or twice as many as the lobes of the calyx. Ovary more or less adherent to the calyx-tube. Fruit dry, capsular, or follicular.

HEUCHERA.—ALUM-ROOT.

Heuchera Americana Linné.—*Alum-Root.*

Description.—Calyx bell-shaped, the tube adherent at the base to the ovary, 5-cleft. Corolla: petals 5, spatulate, as long as the lobes of the calyx, purplish or white. Stamens 5. Styles 2, slender. Pod 1-celled, with 2 parietal placentæ, many-seeded, 2-beaked, opening between the beaks.

An herbaceous perennial. Leaves nearly all radical, roundish-cordate, somewhat 7- to 9-lobed; the lobes short and rounded, dentate-crenate, with short and broad mucronate teeth. Scapes 2 to 3 feet high, glandular, and more or less hirsute with short hairs, rarely with one or two small leaves. Panicle loose, many-flowered, the flowers appearing in May and June.

Habitat.—In woods and rocky places from Connecticut to Wisconsin and southward.

Part Used.—The root—not official.

Constituents.—Alum-root contains from eighteen to twenty per cent. of tannin.

Preparations.—None are official.—It is generally employed in decoction.

Medical Properties and Uses.—Alum-root, though formerly official, is seldom employed except as a domestic remedy. It is chiefly used, in decoction, as a topical astringent in sore throat, leucorrhœa, menorrhagia, etc. Other species of heuchera possess similar properties.

HAMAMELACEÆ.

Character of the Order.—Shrubs or trees, with alternate simple leaves and deciduous stipules. Flowers in heads or spikes, often polygamous or monœcious. Calyx adherent to the base of the ovary. Petals narrow, valvate or involute in the bud, inserted upon the calyx; sometimes wanting. Stamens twice as many as the petals, the alternate ones sterile; sometimes numerous. Ovary 2-celled, each cell 1-ovuled. Fruit a 2-celled, 2-beaked, woody pod, each cell containing a single bony seed.

The fertile flowers of Liquidambar consist of numerous coherent 2-celled, many-ovuled ovaries.

HAMAMELIS.—WITCH-HAZEL.

Hamamelis Virginica Linné.—*Witch-Hazel.*

Description.—Calyx 4-parted, with 2 or 3 bractlets at the base. Corolla: petals 4, long and narrow, strap-shaped, spirally involute in the bud, and considerably contorted when expanded, yellow. Stamens 8, the four alternate ones imperfect and scale-like. Ovary of 2 pistils united at the base; styles short. Pod opening loculicidally from the top, the outer coat separating from the inner, which encloses the single large, bony seed in each cell, but soon bursts elastically into two pieces.

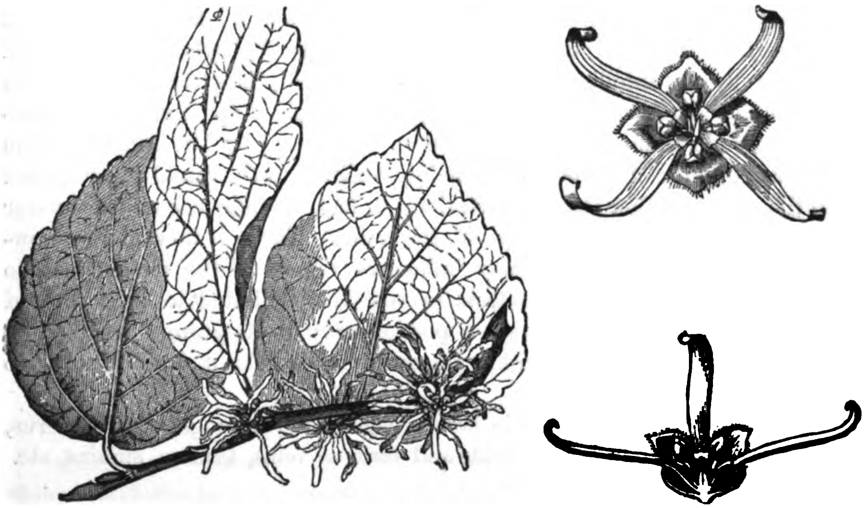


Fig. 127.—Hamamelis Virginica.

A large shrub, 8 to 12 feet high, with flexuous branches. Leaves alternate, on short petioles, obovate or oval, repandly sinuate-crenate, unequal or obliquely sub-cordate at the base, scabrous with minute elevated spots beneath. The flowers are in axillary clusters, appearing from September until late in the fall, the fruit maturing the next year.

Habitat.—In moist woods from Canada to Florida and westward; very common.

Parts Used.—The leaves, and the bark of the young branches. The United States Pharmacopœia directs that the leaves collected in autumn alone be used. In the opinion of the author this is a mistake, for from personal experience he believes the bark of the young branches to be more efficient.

Constituents. Chemical analysis has as yet thrown little light upon the therapeutic activity of witch-hazel. The only constituent thus far discovered of known efficacy is tannin, which was found in the bark in the proportion of 8.10 per cent.

Preparations.—Extractum hamamelidis fluidum—fluid extract of hamamelis.—*United States Pharmacopœia.* A so-called extract of witch-hazel, said to be prepared by distillation, is largely used as a popular remedy. A saturated tincture of the bark has yielded the author more satisfactory results than any other preparation he has employed.

Medical Properties and Uses.—Hamamelis until recently has been little employed except by homœopathic practitioners and by the laity. That it possesses therapeutic activity will be doubted by few who have employed it carefully and intelligently; and that its activity is greater than can be reasonably attributed to the percentage of tannin it contains will be conceded by most unprejudiced observers. As stated by Dr. Piffard: "The sphere of action of hamamelis is mainly confined to the vascular system and to the venous rather than the arterial; in fact, its influence on the former is as decided as that of aconite on the latter. There is no evidence, however, to show that it in any way influences vessels of the viscera, but, so far as yet known, limits its effects to vessels distributed to the skin and mucous membranes. It covers a portion only of the ground occupied by ergot in this respect, but within its own proper field it does not yield to this latter in efficacy."[1]

It is employed internally in hemorrhage from the lungs, bowels, uterus, etc., and topically in hemorrhoids and varicose veins, bruises, sprains, etc.

LIQUIDAMBAR.—SWEET GUM TREE.

Liquidambar Styraciflua Linné.—*Sweet Gum Tree.*

Description.—Flowers usually monœcious; sterile without calyx or corolla, arranged in a conical cluster, stamens numerous; fertile, also naked, consisting of numerous 2-celled ovaries collected in a globular head. Fruit a spherical, woody head, made up of the cohering ovaries, each of whose cells opens at maturity between its two beaks. Ovules in each cell numerous, but only one or two of them perfecting.

A large, beautiful tree; stem straight, freely branched above, with a gray, corrugated bark, that of the young branches, especially in young trees, with elevated corky ridges. Leaves rounded in general outline, deeply 5- to 7-lobed, smooth and shining, glandular-serrate, the lobes pointed. They become deep crimson in autumn, and thus give the tree a strikingly beautiful appearance. The flowers are produced in April, the fruit maturing in autumn and persisting upon the tree until late in the season.

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[1] Materia Medica and Therapeutics, p. 212. By Charles D. F. Phillips, edited by H. G. Piffard. New York, 1879.

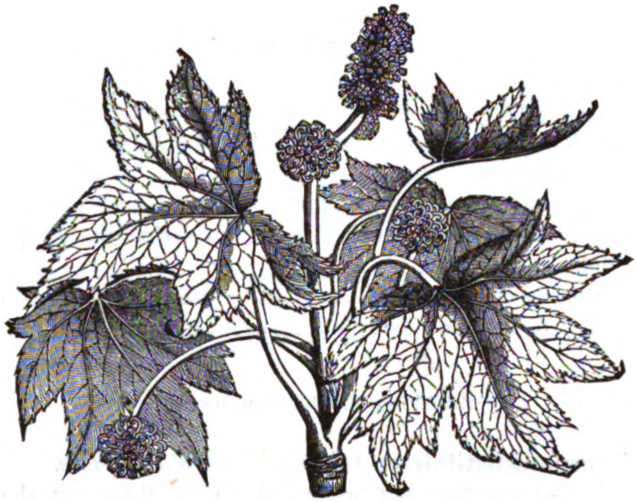


FIG. 128.—Liquidambar Styraciflua.

When wounded the bark exudes a sweetish, resinous gum resembling storax, and possessing similar properties. Storax itself is produced by an exotic species of the same genus, *Liquidambar orientalis* Miller.

Habitat.—In moist woods from Connecticut to Illinois and southward.

Part Used.—The gum—not official.

Constituents.—Sweet gum, as it exudes, is a thick liquid of a syrupy consistence, but hardens upon exposure and finally becomes solid. It has a pleasant balsamic odor and a sweetish, balsamic taste, followed by a sensation of pungency. It contains *cinnamic acid*, *styracin*, and an aromatic oily hydro-carbon having the properties of *styrol*. These are the essential constituents of storax also.

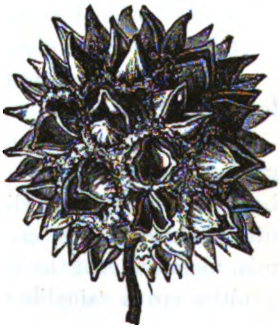


FIG. 129.—Liquidambar Styraciflua (Fruit).

Preparations.—None are official. A syrup of sweet gum, prepared according to the official formula for syrup of tolu, is said to be an eligible preparation.

Medical Properties and Uses.—Like storax, sweet gum is used chiefly in catarrhal affections, especially those of the respiratory and urinary mucous membranes, as chronic bronchitis, cystitis, pyelitis, gonorrhœa, and gleet. Externally, in the form of an ointment, it has been employed successfully in scabies, burns, frost-bites, and indolent ulcers.

ONAGRACEÆ.

Character of the Order.—Herbs, with simple leaves and commonly 4-merous flowers. Calyx tubular, cohering with the 2- to 4-celled ovary, the limb usually 4-cleft, its lobes valvate in the bud. Petals convolute in the bud, occasionally wanting. Stamens as many, or twice as many, as the lobes of the calyx, and inserted upon the calyx-tube. Style single. Fruit succulent or capsular.

An order represented in North America by fifteen genera and one hundred and forty-five species, mostly unimportant plants.

EPILOBIUM.—Willow Herb.

Epilobium angustifolium Linné.—*Great Willow Herb.*

Description.—Calyx-tube not prolonged beyond the ovary, the limb 4-cleft, deciduous. Corolla: petals 4, obovate, unguiculate, pink-purple. Stamens 8. Capsule linear, 4-sided, 4-celled, 4-valved, many-seeded, the seeds with a tuft of long hairs at the end.

An herbaceous perennial. Stem erect, 4 to 7 feet high, simple, mostly glabrous. Leaves sessile, lanceolate, nearly entire, or with slightly undulate margins. Flowers large and showy, in a long spicate raceme, appearing from July till September.

Habitat.—From the mountains of North Carolina northward and westward. Very common from Pennsylvania and New York northward.

Parts Used.—The leaves and root—not official.

Constituents.—Unknown.

Preparations.—There are none. The plant is said to yield its virtues to water or alcohol.

Medical Properties and Uses.—Willow herb is said to be "tonic, astringent, demulcent, and emollient. An infusion of the leaves will be found beneficial in chronic diarrhœa, dysentery, leucorrhœa, menorrhagia, and uterine hemorrhage, and forms an excellent local application for ophthalmia, ulcerations of the mouth and throat, and leucorrhœa. The leaves in poultice are a valuable remedy for foul and indolent ulcers" (King). If the plant be really so valuable as the above statement would indicate, it is rather remarkable that its virtues are not better known and appreciated.

Several other indigenous species of epilobium have been used medicinally, but without acquiring any reputation.

ŒNOTHERA.—Evening Primrose.

Œnothera biennis Linné.—*Evening Primrose.*

Description.—Calyx-tube prolonged beyond the ovary, deciduous, the limb 4-cleft, the lobes reflexed. Corolla : petals 4, obcordate, light yellow. Stamens 8. Capsules oblong, 4-valved, many-seeded.

An annual or biennial herb. Stem erect, commonly hairy, 1 to 5 feet high. Leaves ovate-lanceolate, acute, obscurely toothed. Flowers in a terminal spike ; they expand late in the afternoon or in the evening and wither next day. The plant occurs in numerous varieties, differing in respect to size of flowers, etc.

Habitat.—In fields, waste places, along fences and roadsides ; common everywhere.

Parts Used.—The bark, leaves, and the young branches—not official.

Constituents.—Unknown.

Preparations.—A decoction has been recommended.

Medical Properties and Uses.—Dr. Griffith recommends the decoction as a local application "in infantile eruptions," of what character, however, he does not state. Its virtues, if it have any, are yet to be ascertained.

UMBELLIFERÆ.

Character of the Order.—Herbs, with alternate, mostly compound leaves, and flowers in umbels. Calyx wholly adherent to the ovary ; limb obsolete or minutely 5-toothed. Petals 5, small, imbricate in the bud, or valvate, with the point inflexed, inserted, together with the 5 stamens, upon the disk which crowns the ovary. Ovary 2-celled, each cell 1-ovuled ; styles 2. Fruit composed of 2 seed-like carpels, which during development are closely adherent to each other, but at maturity separate and are usually suspended from the summit of a prolongation of the axis. Each carpel, commonly though erroneously denominated a seed, is marked longitudinally by 5 primary and 5 alternate secondary ridges, between which are minute tubes, called *vittæ*, containing essential oil. Seed proper suspended from the summit of the cell, with a minute embryo in hard albumen. Stems usually hollow. Leaves with dilated or clasping petioles. Umbels generally compound, the secondary ones being termed umbellets.

A very large and well-characterized order, comprising many species of medicinal or economic importance. Many of them possess agreeable aromatic properties ; many others, on the other hand, are actively poisonous. In general the poisonous members of the order grow in wet places, so that an umbellate plant found in such a situation should be viewed with suspicion until its character has been ascertained. The flowers of all plants of the order bear a close similarity to each other, and are therefore of little use in determining the genera, which must be studied by the fruits, leaves, etc.

The order is represented in North America by forty-five genera comprising one hundred and sixty-eight species, few of which are of medicinal importance.

SANICULA.—SANICLE.

Sanicula Marilandica Linné.—*Sanicle, Black Snakeroot.*

Description.—Calyx-teeth persistent. Petals obovate, erect, connivent, with a long inflexed point, greenish or yellowish. Styles elongated and conspicuous, recurved. Fruit globular, the carpels not separating at maturity, without ribs, thickly set with hooked prickles, and having each 5 oil-tubes.

A perennial herb, 2 to 3 feet high. Leaves digitately 5- to 7-parted, the segments incisely and mucronately serrate, the radical ones long-petioled. Umbels irregular or compound, the flowers capitate in the umbellets, most of them perfect but with many staminate ones intermingled, the latter on slender pedicels. Fruits several in each umbellet.

Habitat.—Woods and copses, Canada to Carolina and westward; everywhere common.

Part Used.—The root—not official.

Constituents.—Unknown.

Preparations.—It is administered in powder or decoction.

Medical Properties and Uses.—Perhaps it would be well to state that the medical properties of sanicle, if it have any, are, like its constituents, unknown, though various and contradictory properties have been ascribed to it; as, for instance, that it is nervine, anodyne, and astringent, and that it has been used with advantage in intermittent fever, sore throat, cynanche trachealis, erysipelas, some skin diseases, chorea, gonorrhœa, dysentery, passive hemorrhages, and leucorrhœa. Until further evidence be adduced in its favor, one may reasonably remain skeptical regarding its virtues.

ERYNGIUM.—ERYNGO.

Eryngium yuccæfolium Michaux.—*Rattlesnake's Master, Button Snakeroot.*

Description.—Calyx-teeth persistent. Petals connivent, oblong-obovate, emarginate, with a very long inflexed point. Styles filiform. Carpels semi-terete without ribs or oil-tubes.

A perennial herb, 1 to 6 feet high. Leaves broadly linear, with straight, simple parallel veins, remotely ciliate with soft spines. Flowers sessile, in dense globose or cylindrical heads, appearing in July or August.

Habitat.—Dry or damp pine barrens or prairies from New Jersey to Wisconsin and southward.

Part Used.—The root—not official.

Constituents.—Unknown.

Preparations.—Administered in decoction.

Medical Properties and Uses.—Button snakeroot is one of the numerous plants reputed to cure the bite of the rattlesnake. It is diaphoretic, diuretic, expectorant, and in large doses emetic.

Other indigenous species of this genus probably possess similar properties.

DAUCUS.—CARROT.

Daucus Carota Linné.—*Carrot.*

Description.—Calyx 5-toothed. Corolla. petals obovate, emarginate with an inflexed point, the exterior ones larger than the others, deeply 2-cleft. Fruit ovate or oblong; the carpels with 5 primary slender bristly ribs, of which three are on the back and two on the flattened surface, and 4 secondary ribs, each with a single row of bristles, and underneath it an oil-tube.

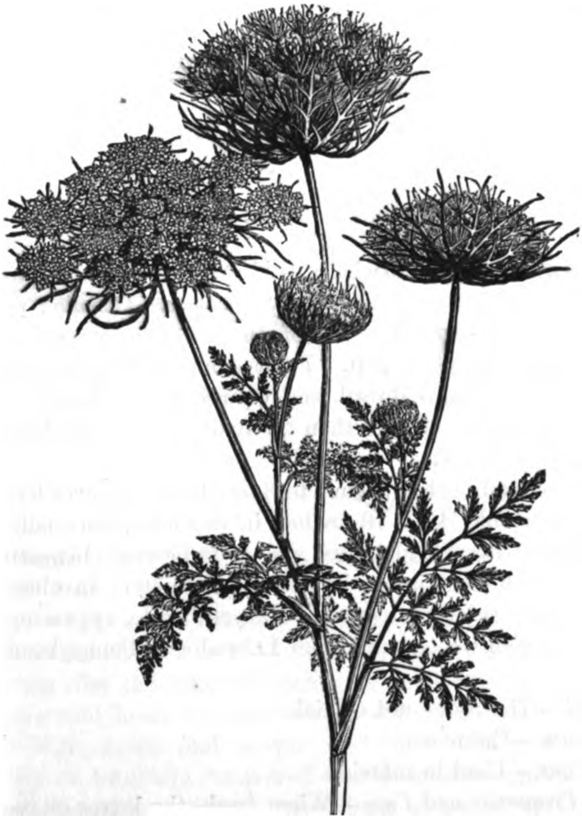


FIG. 130.—Daucus Carota.

A biennial herb, with a fusiform root. Leaves 2- to 3-pinnate, or pinnately divided. Umbels concave, with an involucre of several trifid or pinnatifid leaflets. Flowers white or cream-colored, the central one of each umbellet abortive and dark purple; they are produced throughout the summer.

Habitat.—A native of the Eastern continent but naturalized throughout the United States, and in many places has become a very troublesome weed. The cultivated varieties produce large fleshy roots of great economic value.

Part Used.—The fruit—not official.

Constituents.—Carrot fruit contains a small percentage of aromatic volatile oil, to which it owes its medicinal activity.

Preparations.—It is commonly administered in powder.

Medical Properties and Uses.—Carrot fruit is stimulant, diuretic, and somewhat aromatic. Like many other remedies of similar properties, it has been used to stimulate menstruation and for the relief of strangury. The root of the cultivated plant boiled and reduced to a pulp forms an admirable poultice.

HERACLEUM.—COW-PARSNIP.

Heracleum lanatum Michaux.—*Masterwort, Cow-Parsnip.*

Description.—Calyx-teeth minute or obsolete. Corolla: petals obcordate with an inflexed point, those of the outer flowers often larger and radiant, appearing deeply 2-cleft. Fruit compressed on the back, with a broad flat margin; ribs, 3 dorsal and equi-distant, 2 lateral near the dilated margin; oil-tubes shorter than the fruit, 1 in each interval and usually 2 in the commissure.

A large perennial herb. Stem 4 to 8 feet high. Leaves large, ternately divided, the segments 4 to 10 inches in diameter, unequally lobed, the lobes acuminate, nearly glabrous above, pubescent beneath. Umbels widely spreading, 6 to 10 inches or more in diameter; involucre of 6 to 10 oblong-lanceolate, caducous leaflets. Flowers white, appearing in June.

Habitat.—In rich wet ground from Labrador to Pennsylvania and westward.

Part Used.—The root—not official.

Constituents.—Unknown.

Preparations.—Used in infusion.

Medical Properties and Uses.—When fresh, the leaves or root placed in contact with the skin cause irritation and inflammation. The root is said to be stimulant, antispasmodic, and carminative. Though recommended in epilepsy and a variety of other nervous disorders, little is known of its efficacy. That it is active, even poisonous, seems well established, but its therapeutic uses are yet to be ascertained.

ARCHANGELICA.

Archangelica atropurpurea Hoffman.—*Great Angelica.*

Description.—Calyx-teeth short. Corolla: petals elliptical, entire, with an inflexed point. Fruit somewhat dorsally compressed, smooth; carpels with 3 rather thick carinated dorsal ribs, and with lateral ribs dilated into marginal wings; seed becoming loose in the pericarp, and having numerous oil-tubes which adhere to its surface.

A large perennial herb. Stem 4 to 6 feet high, smooth, striate-sulcate, dark purple. Leaves usually with large inflated petioles, 3-parted, the divisions bipinnately divided; segments of the secondary divisions 5 to 7, sharply cut-serrate, acute. Umbels somewhat globose after flowering, 6 to 8 inches in diameter; flowers greenish-white, appearing in May and June.

Habitat.—Low river banks, Pennsylvania to Wisconsin and northward.

Part Used.—The root—not official.

Constituents.—Unknown, but probably similar to those of European angelica, namely, a volatile oil, a somewhat acrid resin termed *angelicin*, and common vegetable principles.

Preparations.—None are official. The drug is administered in powder or infusion.

Medical Properties and Uses.—Angelica is aromatic, stimulant, diaphoretic, and in large doses emetic. It has been employed with benefit in chronic bronchitis, chronic rheumatism and gout, intermittent fever, etc. Like many other remedies of similar properties, it is used in domestic practice to promote the menstrual discharge.

CICUTA.—WATER-HEMLOCK.

Cicuta maculata Linné.—*American Water-Hemlock, Spotted Cowbane, Musquash Root.*

Description.—Calyx-teeth minute. Corolla: petals obovate with inflexed points, white. Fruit, sub-globose, laterally contracted; carpels with 5 flattish, strong ribs, the intervals each with an oil-tube.

A stout perennial herb, with tuberous roots. Stem 4 to 8 feet high, finely striate with green and purple, and sometimes spotted. Leaves thrice pinnately or ternately compound, the lower ones on long petioles; leaflets lanceolate or oblong, serrate, acuminate, with veins appearing to terminate in the notches; close observation, however, shows that they are continued along one side to the points of the teeth. Umbels without an involucre or with one of 1 or 2 leaflets. The flowers are produced in July and August.

Habitat.—In swamps and wet places; common everywhere.

Water-hemlock, though an energetic poison, is not used medicinally. It is introduced here merely that it may be distinguished from *Conium maculatum*, described below, for the two are not infrequently confounded by the superficial observer.

CONIUM.—Poison Hemlock.

Conium maculatum Linné.—*Poison Hemlock.*

Description.—Calyx-teeth obsolete. Corolla: petals obcordate, with a short inflexed point, white. Fruit ovate, laterally compressed; carpels with 5 prominent, wavy ribs, the intervals without oil-tubes; seed grooved on its face.

A biennial herb, with a fusiform root. Stem 2 to 5 feet high, round, branched, glabrous, often spotted with purple. Leaves decompound; ultimate segments ovate or lanceolate, deeply cut. Umbels terminal, not large for the size of the plant; involucre and involucels 3- to 5-leaved, the latter unilateral. The flowers appear in July.

Habitat.—Conium is indigenous to Europe and Asia, but has become naturalized here and is common in waste places in the Northern and Middle States.

Part Used.—The fruit, gathered while yet green—*United States Pharmacopœia.* The juice of the fresh plant—*Succus conii*—was formerly official, but has been dropped because of its unreliability. The leaves are also efficient, though no longer official.

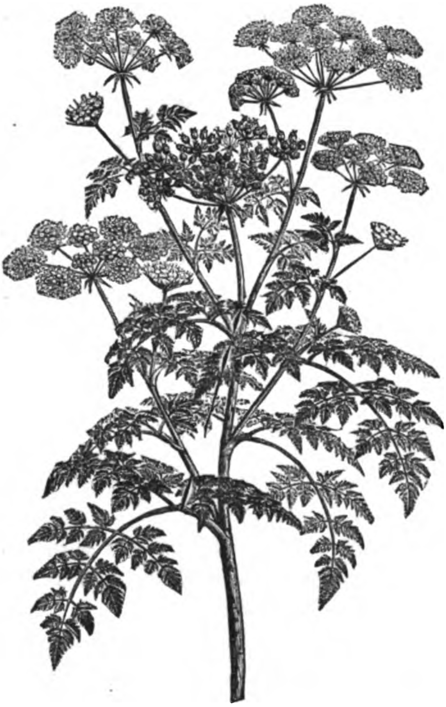


FIG. 131.—Conium maculatum.

Constituents.—The most important constituent of conium is the alkaloid *conia.* This is a volatile, colorless, inflammable, oily liquid, specific gravity 0.88, having a strong alkaline reaction and a disagreeable, tobacco-like odor, resembling that of the fresh plant. The therapeutic virtues of conium reside in conia, its other constituents being unimportant.

Preparations.—Abstractum conii—abstract of conium; extractum conii alcoholicum—alcoholic extract of conium; extractum conii fluidum—fluid extract of conium; tinctura conii—tincture of conium.—*United States Pharmacopœia.*

Medical Properties and Uses.—The literature of few drugs is more unsatisfactory than that of conium, chiefly because inefficient or wholly inert preparations have been so largely employed. The active principle is not only volatile, but also subject to chemical decomposition; hence the leaves and fruit rapidly deteriorate when carelessly preserved, and hence, also, preparations are not infrequently either spoiled during the process of manufacture or ruined by want of care in keeping. From these causes have resulted many of the conflicting statements regarding the therapeutic activity of the drug. Those observers who, reasoning from the physiological action of conium, have deduced the indications for its use as a remedy, mainly agree in recommending it in cases of undue muscular excitement, as in acute mania and chorea, where it is desirable to lessen the wear of the system, and in diseases of a spasmodic character, as asthma, whooping-cough, laryngismus stridulus, and tetanus. This deduction is exceedingly plausible, since conium exerts its most decided effects upon the motor nerves, and probably has no direct action upon the sensory filaments. But those observers who have rested their opinions upon clinical experience rather than theoretical deductions, assert quite as positively that conium exerts an alterant and deobstruent influence upon a variety of glandular enlargements and tumors, and that it is capable of relieving the pains of cancer and those of other painful affections. With greater care in the selection of efficient preparations, these differences of opinion will probably grow rapidly less, and soon the true place of the drug will be found.

ARALIACEÆ.

Character of the Order.—Herbs, shrubs, or trees, having the general characteristics of the Umbelliferæ, but differing in respect to the fruit, which always consists of more than two carpels and is in the form of a drupe. The order is represented in North America by two genera, namely, Aralia and Fatsia, the former comprising medicinal species.

ARALIA.

Character of the Genus.—Calyx-tube adherent to the ovary, the limb 5-toothed, or entire and almost obsolete. Corolla: petals 5, inserted on the margin of the epigynous disk. Stamens 5, alternating with the petals, epigynous. Styles 2- to 5, mostly distinct, or, in the sterile flowers, short and united. Ovary 2- to 5-celled, with a single pendulous ovule in each cell. Fruit a drupe, with as many seeds as there are cells in the ovary.

Herbs, shrubs, or trees, with compound or decompound leaves. Flowers more or less polygamous, white or greenish, in umbels.

The genus comprises two sub-genera, Aralia proper and Ginseng (*Panax* Linné).

Aralia.—Flowers monœciously polygamous or perfect. Styles and cells of the ovary 5. Fruit black or dark purple.

Aralia spinosa Linné.—*Angelica Tree, Hercules' Club.*

Description.—A shrub or low tree. Stem and petioles prickly. Leaves bipinnately compound; leaflets ovate, serrate, acuminate, glabrous above, glaucous beneath. Umbels in a very large, much-branched panicle. Flowers white, appearing in July and August.

Habitat.—In damp woods on river-banks from Pennsylvania to Florida and westward.

Aralia racemosa Linné.—*Spikenard.*

Description.—An herbaceous perennial. Stem 3 to 5 feet high, divaricately branched. Leaves ternately or quinately decompound; leaflets cordate-ovate, doubly serrate, acuminate, slightly pubescent. Umbels small and numerous, in large doubly compound racemose panicles. Flowers small, greenish-white, appearing in July. The roots are large and fleshy, and have, as well as the whole plant, an aromatic but not altogether agreeable odor.

Habitat.—In rich woods from Canada to Georgia and westward.

Aralia nudicaulis Linné.—*Wild Sarsaparilla.*

Description.—An herbaceous perennial. Root or rhizome long, prostrate, creeping just beneath the surface of the ground. Stem very short, bearing a single long-stalked leaf and a shorter scape. Petiole 3-cleft, each division pinnately 5-foliate; leaflets oblong-ovate, or oval, serrate, acuminate. Scape with 2 to 7 umbels of greenish-white flowers. Fruit purplish-black. The flowers appear in May and June.

Habitat.—In rich moist woods from Canada to the mountains of the Southern States.

Ginseng (*Panax* Linné).—Flowers diœciously polygamous. Styles and cells of the ovary 2 or 3. Fruit red or reddish.

Aralia quinquefolia Decaisne and Planchon—(*Panax quinquefolium* Linné).—*Ginseng.*

Description.—An herbaceous perennial. Root large and spindle-shaped. Stem 1 foot high, bearing at its summit a whorl of three palmately 3- to 7-foliate leaves and a single umbel; leaflets obovate-oblong, acuminate. Peduncle naked, slender, about as long as the petioles; flowers yellowish-green, appearing in July.

Habitat.—In rich upland woods from Canada to the mountains of the Southern States.

Parts Used.—Of A. spinosa, the bark; of A. racemosa, A. nudicaulis, and A. quinquefolia, the root. None of the plants are official.

Constituents.—In the bark of A. spinosa have been found two acrid resins, a volatile oil, and what is thought to be an uncrystallizable alkaloid, besides common vegetable principles. The constituents of the other species are unknown.

Preparations.—Whatever virtues any of these plants possess are yielded to boiling water. Fluid extracts of two or three of them occur as commercial articles.

Medical Properties and Uses.—All these plants possess, to a greater or less extent, aromatic and stimulant properties, and probably no others, though many diverse virtues have been attributed to them. A. spinosa is apparently the most active. A. nudicaulis, as its common name (*wild sarsaparilla*) indicates, was formerly supposed to partake of the virtues of true sarsaparilla, but as the latter plant is at present little esteemed, the reputed virtues of the former are not worthy of much attention. A. quinquefolia (*ginseng*) is at present only esteemed by the Chinese, who consider it a panacea.

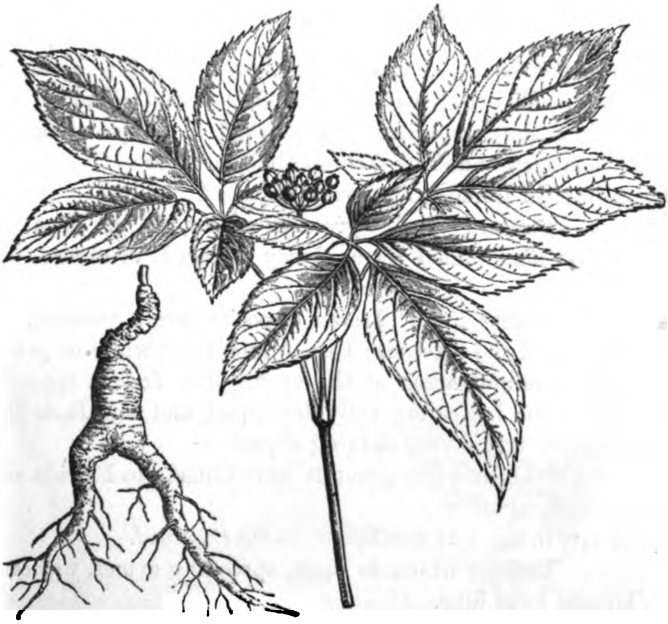


FIG. 132—Aralia quinquefolia.

As remarked above, all these plants are aromatic and stimulant. Given in warm infusion they are capable of inducing diaphoresis, and in this manner acting beneficially in certain cases, as chronic rheumatism and various cutaneous eruptions. Doubtless the manner in which the drug is administered has quite as much to do with the effect produced as any medicinal property of the drug itself. Hence the alterative properties formerly attributed to these plants have little foundation in fact.

CORNACEÆ.

Character of the Order.—Shrubs or trees, with opposite or alternate, simple leaves. Calyx-tube adherent to the ovary, its limb 4-toothed. Petals 4, valvate in the bud. Stamens 4, inserted with the petals on the margin of an epigynous disk. Style single; ovary 1-celled, each cell with a single suspended ovule. Fruit a 1- to 2-seeded drupe.

A small order, represented in North America by three genera, namely, Cornus, Garrya, and Nyssa, the first-named alone comprising medicinal species.

CORNUS.—CORNEL—DOGWOOD.

Character of the Genus.—Parts of the flower as in the character of the order. Fruit a small drupe, with a 2-celled, 2-seeded stone. Leaves opposite except in a single species. Flowers small, in open naked cymes, or in close heads surrounded by a corolla-like involucre.

Cornus florida Linné.—*Flowering Dogwood.*

Description.—Flowers small, greenish-yellow, in a close head or cluster, which is surrounded by a showy 4-leaved involucre. Drupes bright red.

A tree, 10 to 30 feet high. Leaves opposite, ovate, pointed, acute at the base. Leaves of the involucre 1 to 1½ inch long, white or pinkish, obcordate, or with a callous notch at the apex. The flowers appear in May and June, before the leaves are fully developed, and with their showy involucres render the tree a very striking object.

Habitat.—In woods and low grounds from Canada to Florida and westward; everywhere common.

Cornus circinata L'Her.—*Round-leaved Dogwood.*

Description.—Flowers white, in open, spreading cymes, without an involucre. Drupes light blue.

A shrub, 6 to 10 feet high. Leaves opposite, broadly oval or orbicular, abruptly acuminate, 4 to 5 inches long, 2 to 5 inches broad, tomentose beneath. The cymes are rather small, but numerous; the flowers appear in June, after the leaves are pretty well developed.

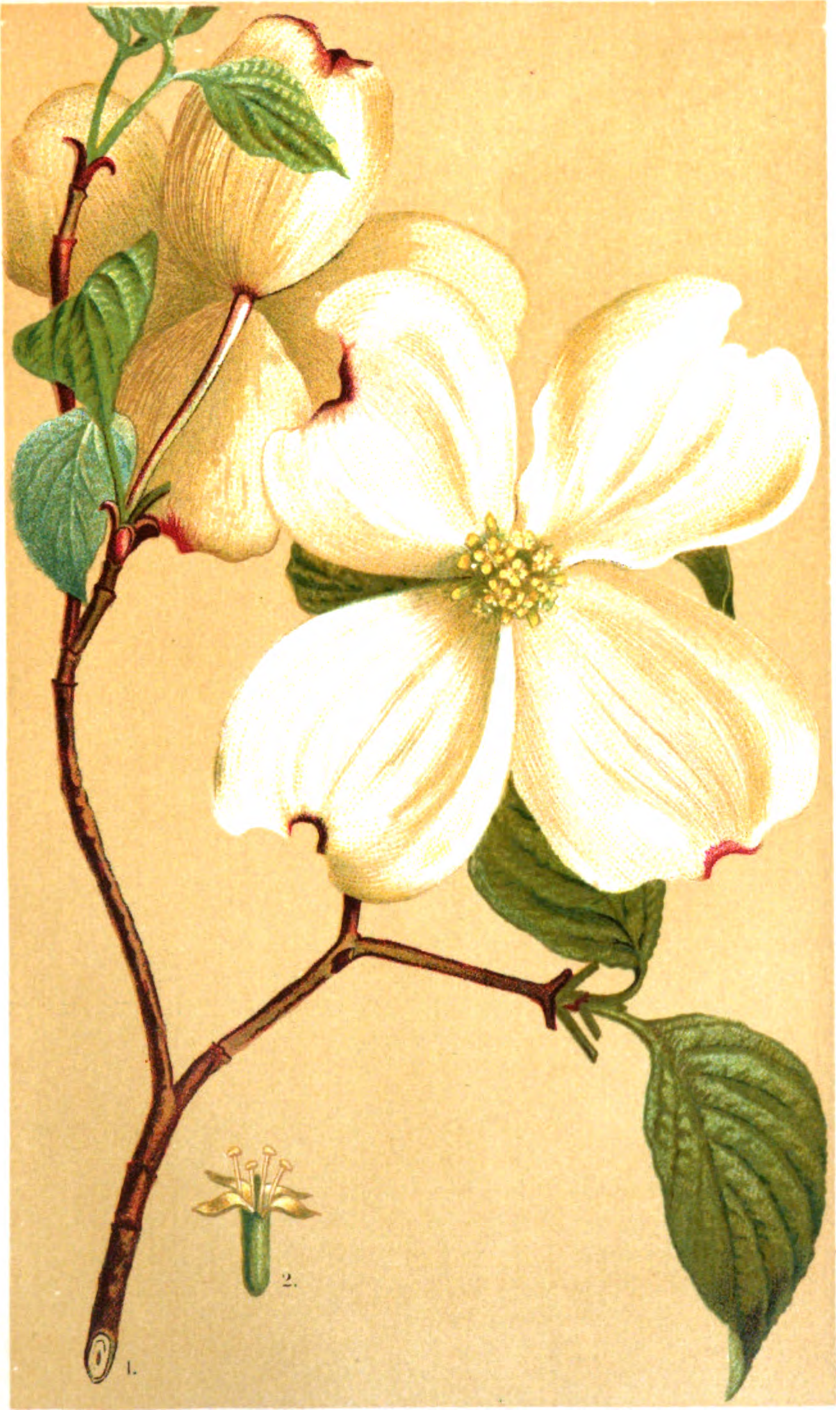
Habitat.—Shady banks of streams from Canada to the mountains of Virginia and westward.

Cornus sericea Linné.—*Swamp Dogwood, Silky Cornel.*

Description.—Flowers white, in open, spreading cymes, without an involucre. Drupes light blue.

A shrub, 6 to 10 feet high, the bark greenish-purple or brownish-purple. Leaves ovate or elliptical, conspicuously pointed, the lower surface, as well as the petioles and smaller branches, silky-pubescent. Cymes close; the flowers appear in May and June.

PLATE V.



L. Johnson. Del.

CORNUS FLORIDA.

H. BENCKE LITH. N.Y.

Plate V.—Cornus florida.

Fig. 1.—Flowering branch, natural size.

Fig. 2.—Single flower, enlarged.

Habitat.—In wet places, Canada to Georgia and westward.

Part Used.—The bark of the root of Cornus florida—*United States Pharmacopœia.* The bark of all the species is employed, though that of the root is said to be most efficient.

Constituents.—The bark of the official species has a bitter, astringent, and slightly aromatic taste. Besides the ordinary vegetable principles, it contains a peculiar bitter principle, termed *cornin,* or *cornic acid,* to which its medicinal virtues are probably, in a great measure, due. Its astringency is due to a small percentage of gallic and tannic acids. The other species of cornus are believed to contain similar principles.

Preparations.—Extractum cornus fluidum—fluid extract of cornus.—*United States Pharmacopœia.* The decoction is also said to be an efficient preparation, though Professor Maisch observed that the bitter principle, when in aqueous solution, is altered and destroyed by exposure to air and heat. The bark is also administered in powder. A commercial article occurs, erroneously termed *cornin,* which is prepared by evaporating an aqueous extract or by precipitating an alcoholic tincture with water; it is said to be much less efficient than the official fluid extract.

Medical Properties and Uses.—Dogwood is tonic, astringent, and slightly aromatic. It is believed to be the best indigenous substitute for cinchona bark, and in early days was used with considerable success in the treatment of miasmatic fevers. As a mild tonic in convalescence, in simple loss of appetite, and in debility of the digestive organs, it is also said to act favorably.

Division II.—Monopetalous Exogenous Plants.

Plants with both calyx and corolla, the latter composed of petals more or less united, and hence termed monopetalous.

CAPRIFOLIACEÆ.

Character of the Order.—Shrubs or small trees—rarely herbs—with opposite, simple or compound leaves. Calyx-tube adherent to the ovary, its limbs 4- to 5-cleft or lobed. Corolla tubular, urn-shaped or wheel-shaped, equally or unequally 4- to 5-lobed. Stamens as many as the lobes of the corolla—sometimes one less—inserted upon its tube. Ovary 2- to 5-celled; style filiform, somewhat capitate, sometimes absent, when the 2 to 5 stigmas are sessile. Fruit a berry, drupe, or pod, 1- to many-seeded.

An order represented in North America by seven genera, four of which comprise medicinal species.

DIERVILLA.—BUSH-HONEYSUCKLE.

Diervilla trifida Moenchausen.—*Bush-Honeysuckle.*

Description.—Calyx-tube attenuated at the summit, its limb 5-parted, the lobes linear or awl-shaped, persistent. Corolla funnel-formed, the limb 5-cleft, regular, or slightly 2-lipped, greenish-yellow, about three-fourths of an inch long. Stamens 5. Ovary 2-celled ; stigma peltate-capitate. Pod ovoid-oblong, pointed, 2-celled, 2-valved, septicidal, many-seeded.

An upright shrub, 2 to 4 feet high. Leaves 2 to 4 inches long, oblong-ovate, acuminate, serrate, on short petioles. Peduncles axillary or terminal, 1- to 3-flowered. The flowers appear from June to August.

Habitat.—Rocky woods from Canada to the mountains of North Carolina.

Parts Used.—The root, leaves, and twigs—not official.

Constituents.—Unknown.

Preparations.—It is commonly employed in infusion.

Medical Properties and Uses.—Said to be diuretic, astringent, and alterative, and to have been used successfully in nephritic and calculous affections, in gonorrhœa, and inflammation of the bladder with gravelly deposit. If it were not also said to be curative in syphilis, one might possibly have some faith in its medicinal virtue. As, however, the latter statement is just as authoritative as the former, the whole subject is left in doubt.

TRIOSTEUM.—FEVERWORT.

Triosteum perfoliatum Linné.—*Feverwort, Horse-Gentian, Wild Ipecac.*

Description.—Calyx-tube ovoid, its limb 5-parted, the segments linear-lanceolate, leaf-like, persistent. Corolla tubular, somewhat gibbous at the base, almost equally 5-lobed, about as long as the calyx, brownish-purple. Stamens 5. Ovary commonly 3-celled, with a single suspended ovule in each cell ; style slender. Fruit a rather dry drupe, 3-angled, 3-seeded.

An herbaceous perennial, with a thick, fleshy root. Stem 2 to 4 feet high, stout, simple, softly hairy. Leaves opposite, cuneate at the base, 4 to 7 inches long, 2 to 4 inches wide, oval or ovate, acuminate, abruptly narrowed below, hairy above, velvety-pubescent beneath. Flowers axillary, sessile or nearly so, solitary or clustered, appearing in June.

Habitat.—In rich woodlands from Canada to the mountains of North Carolina and westward.

Part Used.—The root—not official.

Constituents.—Unknown.

Preparations.—Triosteum yields its virtues to water and alcohol, and may be administered in infusion or tincture.

Medical Properties and Uses.—The root has a disagreeable odor and a bitter, nauseous taste. It is cathartic and in large doses emetic; rarely used.

SAMBUCUS.—ELDER.

Sambucus Canadensis Linné.—*Common Elder.*

Description.—Calyx minutely 5-toothed, the teeth at length obsolete. Corolla urn-shaped, the lobes obtuse, widely spreading. Stamens 5. Stigmas 3. Fruit a juicy, berry-like drupe, containing 3 small seed-like nutlets.

A shrubby plant, with numerous stems, 5 to 10 feet high, with a comparatively large pith. Leaves unequally pinnate; leaflets 7 to 11, oblong or oval, acuminate, serrate. Flowers numerous, white, in compound cymes, appearing in June. Fruit small, dark purple or black, edible, though having a taste which is, to most people, rather disagreeable.

Habitat.—In thickets and along neglected fences from Canada to Florida and westward; everywhere common.

Part Used.—The flowers—*United States Pharmacopœia.* The berries, the inner bark of the stem, and the bark of the root are also employed, but are not official.

Constituents.—Of the flowers: they have a peculiar, sweetish odor and a bitterish taste. Upon distillation with water they yield a peculiar volatile oil of a butyraceous consistence. Of the berries: saccharine matter and malic acid. Of the bark: an acid identical with *valerianic acid,* besides common vegetable principles.

Preparations.—None are official. An aromatic water, prepared by distillation from the flowers of a European species, is official with the British. The inspissated juice of the berries has been employed medicinally, and a wine made by fermenting the fresh juice is considerably used in some parts of the country. The bark is commonly employed in infusion.

Medical Properties and Uses.—Elder-flowers are said to be slightly sudorific; in the form of the distilled water, their only use is as a fragrant vehicle. The berries are sometimes used in preparing cooling drinks; they appear to have no special medicinal activity. The bark and root are actively cathartic and were formerly used as hydragogues.

VIBURNUM.—ARROW-WOOD.

Character of the Genus.—Calyx 5-toothed. Corolla rotate, deeply 5-lobed. Stamens 5. Ovary 1- to 3-celled; one of the cells containing an ovule, the others abortive; stigmas 3. Fruit a 1-celled, 1-seeded drupe, with a thin pulp and a crustaceous, somewhat flattened stone.

Shrubs or small trees, with simple, undivided, or lobed leaves. Flowers white, in flat, terminal, compound cymes; the marginal flowers sometimes sterile or radiant.

Viburnum prunifolium Linné.—*Black Haw.*

Description.—Flowers all alike, fertile. Fruit oblong-ovoid, compressed, bluish-black, glaucous, sweet.

A shrub or small tree, 8 to 20 feet high. Leaves roundish-oval, ovate or obovate, obtuse or abruptly pointed, finely and sharply serrate, bright green, glabrous. Cymes numerous, sessile, appearing in May.

Habitat.—In dry woods and thickets from Connecticut to Illinois and southward.

Viburnum Opulus Linné.—*Cranberry Tree, High Cranberry, Cramp-Bark.*

Description.—Marginal flowers of the cymes without stamens or pistils, but with corollas much larger than those of the fertile flowers. Fruit nearly spherical, half an inch long, bright red, of a pleasant acid taste, resembling that of cranberries, for which it is sometimes substituted.

A shrub, 3 to 10 feet high, with spreading branches. Leaves 3-lobed, 3-ribbed, the lobes acuminate, toothed. Cymes 3 to 4 inches in diameter. The flowers appear in May and June. A cultivated variety of this species, the common garden snow-ball bush, has all its flowers sterile.

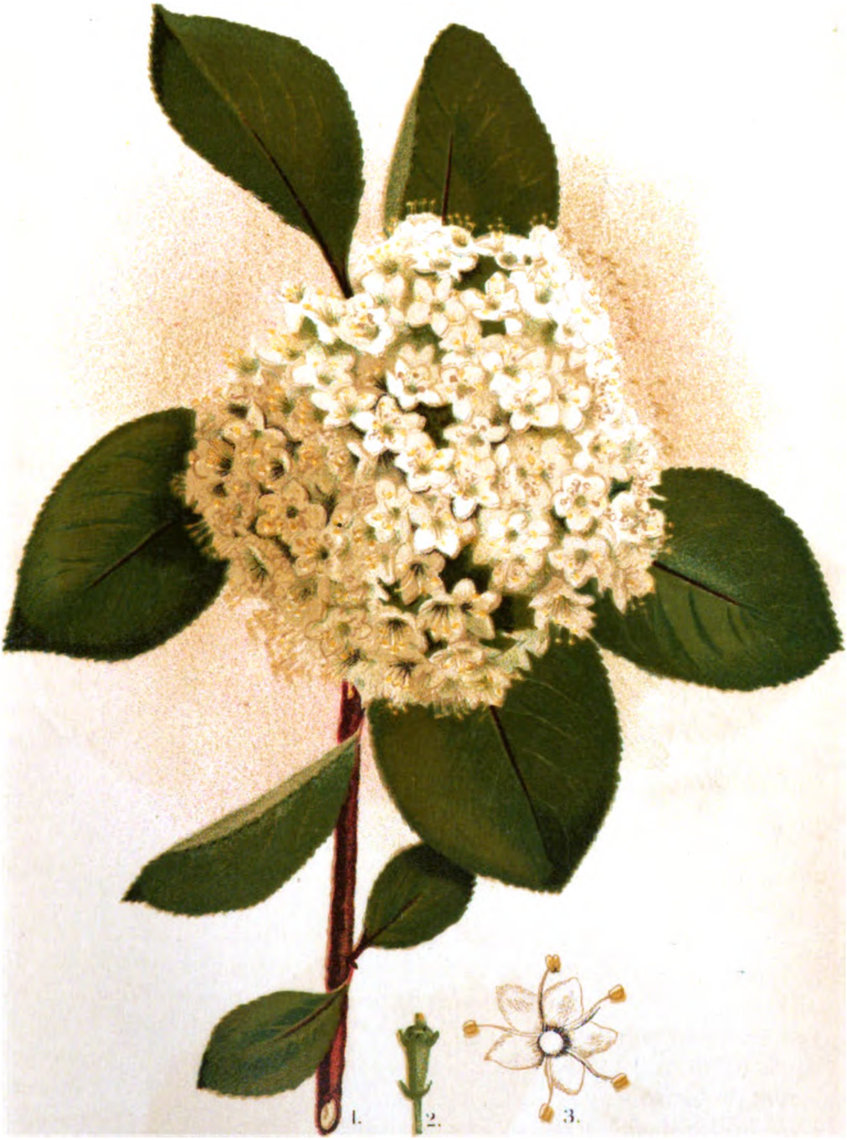
Habitat.—In swamps and along streams from Pennsylvania northward; less common than the preceding.

Part Used.—The bark of V. prunifolium—*United States Pharmacopœia.* The bark of V. Opulus has also been employed, and is said to act like that of the official species.

Constituents.—Analysis of V. prunifolium has shown the presence of a brown resinous body of a very bitter taste, a greenish-yellow resin, or neutral principle, also bitter, termed *viburnin*, valerianic acid, tannin, and other unimportant vegetable constituents. V. Opulus probably possesses similar constituents.

Preparations.—Extractum viburni fluidum—fluid extract of viburnum.—*United States Pharmacopœia.* There are commercial fluid extracts of V. Opulus.

Medical Properties and Uses.—Both these species of viburnum are said to be antispasmodic, nervine, astringent, and tonic, and to act specifically upon the uterus. V. prunifolium is especially praised as a uterine sedative, and is considered by many very efficient in threatened abortion and in dysmenorrhœa. The author has experimented with it to a considerable extent, but with very unsatisfactory results. He has employed it in many cases of threatened abortion, enjoining at the same time absolute rest in the recumbent position, but never with any good effect which could be fairly attributed to the drug. He has never been able to discover that it restrains hemorrhage or abates any of the ordinary symptoms of threatened abortion. He has observed, however, that to many patients it is intensely disagreeable, not unfrequently exciting nausea and vomiting, and thus directly contributing to bring about the result which it was intended



L. Johnson. Del.

VIBURNUM PRUNIFOLIUM.

H. BENCKE LITH. N.Y.

Plate VI.—Viburnum prunifolium.

FIG. 1.—Flowering branch.

FIG. 2.—Calyx and pistil.

FIG. 3 —Corolla and stamens—all natural size.

to avert. With its use in dysmenorrhœa he has had less experience, but, so far as it goes, tending only to confirm him in the opinion that viburnum, as a uterine sedative, has been much overrated.

RUBIACEÆ.

Character of the Order.—Shrubs or herbs, with opposite leaves connected by stipules, or with leaves in whorls without apparent stipules. Calyx adherent to the ovary. Corolla 3- to 5-lobed, inserted, together with the same number of stamens, upon the calyx-tube. Ovary 2- to 4-celled. Fruit various.

A large order, comprising many important plants, among them the coffee and cinchona trees, but represented in North America by only a few comparatively unimportant genera.

GALIUM.—BEDSTRAW.—CLEAVERS.

Character of the Genus.—Calyx-teeth obsolete. Corolla commonly 4-parted, rarely 3-parted, wheel-shaped, valvate in the bud. Stamens as many as the lobes of the corolla. Styles 2. Fruit globular, dry or fleshy, separating at maturity into two indehiscent, seed-like carpels, each containing a single seed.

Slender herbs, with square stems, whorled leaves, and small axillary or terminal cymose flowers. The roots frequently contain red coloring matter.

Galium Aparine Linné.—*Cleavers, Goose-Grass.*

Description.—Flowers axillary, on 1- to 2-flowered peduncles, white. Fruit large, bristly with hooked prickles.

An annual herb, with a weak, reclining stem, bristly with recurved prickles. Leaves in whorls of about 8, lanceolate, tapering at the base, short-pointed, rough on the margins and mid-rib. It flowers from May or June forward.

Habitat.—Common in shady thickets and margins of woods. The plant is indigenous to Europe, but whether introduced or indigenous here is not known.

Galium triflorum Michaux.—*Sweet-scented Bedstraw.*

Description.—Flowers axillary, on 3-flowered peduncles, greenish. Fruit hispid with hooked bristles.

An herbaceous perennial. Stem reclining or procumbent, bristly or hispid backward upon the angles. Leaves in whorls of 6, elliptical-lanceolate, bristle-pointed, 1-veined, the margins commonly roughened. It flowers in June and July.

Habitat.—Moist and rich woodlands throughout the United States and Canada.

Part Used.—The herb—not official. The roots of several species of galium were used by the aborigines as dye-stuffs.

Constituents.—These and several other species of galium contain either *galitannic* or *aspertannic* acid, together with other organic acids, a bitter principle, and common vegetable principles. G. triflorum contains also *coumarin,* to which its fragrant odor is due.

Preparations.—There are commercial fluid extracts of some of the species, but when used at all the plants are commonly administered in decoction or in the form of the recently expressed juice.

Medical Properties and Uses.—Galium Aparine is diuretic and refrigerant. It has been used in many diseases of the urinary organs, in scaly affections of the skin, and in cancer, with asserted benefit. G. triflorum acts in a similar manner, but as it contains coumarin, it might also be expected to exert some influence upon the nervous system.

CEPHALANTHUS.—BUTTON-BUSH.

Cephalanthus occidentalis Linné.—*Button-Bush.*

Description.—Calyx-tube inversely pyramidal, the limb 4-toothed. Corolla tubular, slender, its limb 4-cleft, the lobes erect, imbricate in the bud. Stamens 4, style filiform, exserted; stigma capitate. Fruit dry, inversely pyramidal, 2- to 4-celled, separating from the base to the summit into 2 to 4 closed, 1-seeded portions.

A shrub, 3 to 10 feet high. Leaves opposite or ternate, oval or lanceolate, pointed, 3 to 5 inches long. Flowers densely aggregated in close globose heads, axillary or terminal, appearing in July and August.

Habitat.—Margins of swamps and in wet places, Canada and the United States.

Part Used.—The bark—not official.

Constituents.—Cephalanthus contains tannin, an uncrystallizable bitter principle, a principle analogous to saponin, two resins, and common vegetable principles.

Preparations.—The virtues of the bark are yielded to water and alcohol, and hence it may be administered in infusion or tincture.

Medical Properties and Uses.—Like nearly all vegetable substances possessing bitterness, this has been employed with asserted success in intermittent and remittent fevers. It has not, however, attained an established reputation, and its medicinal virtues are altogether problematical.

MITCHELLA.—PARTRIDGE-BERRY.

Mitchella repens Linné.—*Partridge-Berry, Squaw-Berry.*

Description.—Flowers in pairs with ovaries united. Calyx 4-toothed. Corolla funnel-formed, with a slender tube, its limb 4-lobed, the lobes spreading, densely bearded inside with white hairs. Stamens 4, inserted in the throat of the corolla. Style filiform; stigmas 4. Fruit baccate, bright red, composed of the united ovaries of both flowers, each of which contains 4 small horny, 1-seeded nutlets. It is edible but insipid.

A small creeping, evergreen herb. Stems slender, 6 to 12 inches long, branching and rooting at the joints and becoming matted upon the surface of the ground. Leaves one-half inch long, opposite, roundish, dark green and shining, generally marked with a central longitudinal line of a lighter color, of a coriaceous texture. Flowers of two kinds, one with stamens exserted and style included, the other with style exserted and stamens included; these different kinds of flowers occur in different plants. The flowers are white, about one-half inch long, and though generally with their parts in fours, not unfrequently have them in fives, or even in sixes; they are produced in June. The whole plant turns black in drying.

Habitat.—In moist woods, about the roots of trees, often forming a vivid green matting, variegated in autumn by the bright red berries, the latter often persisting till spring. Everywhere common.

Part Used.—The herb—not official.

Constituents.—Unknown.

Preparations.—It is administered in infusion or decoction.

Medical Properties and Uses.—The medical properties of this plant are altogether problematical. It is said to be astringent, diuretic, and parturient. Squaws are said to use a decoction of it for some weeks previous to their parturition, in order to render their delivery safe and easy; white women sometimes use slippery elm for the same purpose, and probably with about the same amount of benefit.

COMPOSITÆ.

Character of the Order.—Flowers, relatively small, collected in a dense head upon a common receptacle and surrounded by an involucre of bracts, the whole resembling a single flower, and termed by the older botanists compound. The separate flowers: calyx-tube coherent with the ovary, its limb, termed *pappus*, composed of bristles, plumose hairs, scales, or even minute leaflets, though sometimes absent entirely or reduced to a mere margin. Corolla usually composed of 5 united petals, either ligulate or tubular. Stamens 5, rarely fewer, their anthers linear and united into a tube, sometimes with an appendage at the top or at the base. Ovary 1-celled, 1-ovuled; style in the fertile flowers 2-cleft, the lobes often furnished with hairs for collecting pollen, the stigmatic surfaces in the form of elevated lines along the inner margins. Fruit an achenium crowned with the pappus.

A very large order of herbs, rarely shrubs or trees, comprising about one-tenth of the flowering plants of the world. The flowers occur in many different forms. When all of them are perfect the head is said to be *homogamous;* when the marginal ones are pistillate or neuter and the others are perfect or staminate, the head is termed *heterogamous.* The flowers with a strap-shaped (*ligulate*) corolla are termed *rays,* or *ray-flowers;* and when these are present the head is termed *radiate.* A head composed entirely of tubular flowers is termed *discoid,* and tubular flowers occupying the centre of a radiate flower make what is called the *disk.* In some cases the staminate and pistillate flowers are upon different individuals—then the plant is *diœcious.* The receptacle is *paleaceous* or *chaffy* when covered with membranaceous scales, and *naked* when destitute of them.

To indicate, even in the most general way, the medicinal character of such an immense order of plants is well-nigh impossible. It will suffice to say that very many of them possess tonic properties, few are aromatic, most are disagreeable, and none are poisonous.

LIATRIS.—Button Snakeroot.

Character of the Genus.—Heads few- or many-flowered; flowers all tubular, perfect. Scales of the involucre few or many, imbricate, appressed. Receptacle naked. Corolla 5-lobed, the lobes usually elongated. Branches of the style much exserted, roundish or somewhat flattened, obtuse. Achenia round, slender, tapering to the base, 10-ribbed. Pappus of 10 to 40 plumose or barbellate bristles.

Perennial herbs, with simple stems and tuberous roots. Leaves alternate, usually lanceolate or linear, entire, with a rigid margin, often resinous-dotted. Heads in an elongated spike or raceme, sometimes paniculate, rarely cymose; flowers showy, rose-purple, rarely pale or white.

Liatris spicata Willdenow.—*Button Snakeroot, Devil's Bit, Colic Root.*

Description.—Heads 8- to 12-flowered, one-fourth to one-half inch long, sessile, in an elongated spike; involucre cylindrical-campanulate, obtuse at the base, the numerous scales appressed, obtuse, punctate, and with narrow, scarious, purplish margins, the inner ones oblong, the outer ovate or oval. Pappus densely barbellate; achenia hairy.

Stem erect, 3 to 5 feet high, smooth, leafy, proceeding from a roundish corm or tuber. Leaves very numerous, hairy on the veins beneath, punctate, those of the stem linear, diminishing in length from below upward, the radical ones also linear, but very long.

Habitat.—In moist ground from Southern New York to Wisconsin and southward.

Liatris odoratissima Willdenow.—*Vanilla Plant, Deer's Tongue.*

Description.—Heads small, 4- to 10-flowered, in a panicle or corymb; scales of the involucre few, slightly imbricated, spatulate-oblong. Corolla-lobes short, ovate. Pappus minutely barbellate, not plumose.

Stem simple or branched above, 2 to 4 feet high, from a short rhizome, not tuberous. Leaves thick, somewhat glaucous, the radical ones obovate-spatulate, tapering at the base, often slightly and obtusely toothed, the upper ones oblong, clasping. The flowers are bright purple and appear in September and October.

Habitat.—In pine barrens from Virginia southward.

These two species are described, since they represent the marked characteristics of the genus. Several other species are or have been employed medicinally, but they do not differ materially in effect from L. spicata.

Parts Used.—Of L. spicata, the root—not official; of L. odoratissima, the leaves—not official.

Constituents.—The rhizomes contain volatile oil and resin. The leaves of L. odoratissima contain *coumarin.*

Preparations.—Fluid extracts and tinctures of L. spicata occur as commercial articles, while L. odoratissima is employed in substance only.

Medical Properties and Uses.—L. spicata is one of the numerous "snakeroots" or remedies for snake-bites. It probably possesses no antidotal properties whatever, and the beneficial effects attributed to it are doubtless due to the diaphoresis induced by the administration of large quantities of hot decoction. As the drug possesses stimulating properties a diaphoretic effect is readily induced in this manner, but there is every reason to doubt its efficacy in cases of venomous snake-bites.

L. odoratissima deserves much more attention from the fact that it is largely used as an adulterant of smoking tobacco, than from any demonstrated medicinal virtues. There is abundant evidence to show that the leaves of this plant enter largely into the manufacture of many grades of smoking tobacco, especially those employed in our domestic cigarettes. And the author is convinced, from personal experience and observation, that the deleterious effects produced by smoking tobacco thus adulterated are much greater than those produced by the consumption of pure tobacco in even great excess. The inhalation of a few whiffs of the smoke from a cigarette made of this adulterated material, provided the inhalations are made in quick succession, produces a train of cerebral sensations of an intoxicating character as much different from any effect of tobacco alone as could be imagined ; and prolonged use of such cigarettes invariably produces great derangement of the digestive organs, very little resembling the dyspepsia induced by excessive use of tobacco, together with cardiac symptoms often of a distressing character. And again, the habit of smoking coumarin in this form appears to become more inveterate, more exacting, than that of the use of tobacco alone, so that the unhappy victim—for such he should be called—is never comfortable except when indulging. Hence it happens that cigarette-smoking in this country, in its effects upon adolescents especially, is assuming the proportions of a great national evil, and is producing far more deleterious effects than in other countries where it is practised to a greater extent but with different material.

EUPATORIUM.—THOROUGHWORT.

Character of the Genus.—Heads few- or many-flowered; flowers all tubular, perfect. Involucre cylindrical or campanulate, the scales imbricated in two or more series, or sometimes nearly equal in a single series. Receptacle flat or slightly convex, naked. Corolla 5-toothed. Anthers included. Branches of the style mostly exserted. Achenia 5-angled. Pappus a single series of capillary bristles, scabous or minutely serrulate.

Perennial herbs, with opposite, rarely alternate or whorled leaves. Heads generally corymbose; flowers purple, blue, or white. Leaves and flowers often resinous-dotted.

Eupatorium perfoliatum Linné.—*Thoroughwort, Boneset.*

Description.—Heads 10- to 15-flowered, white, in a large compound corymb. Scales of the involucre 12 to 15, very pubescent, glandular, imbricated; the inner ones linear-lanceolate, with scarious tips. Achenia glabrous or minutely glandular.

Stem stout, 2 to 4 feet high, very pubescent or hirsute, corymbosely branched above. Leaves lanceolate, opposite, united at the base about the stem so as to appear perfoliate, tapering to a slender point, obtusely serrate, veiny, wrinkled, the lower surface tomentose-pubescent and resinous-dotted. It flowers late in summer.

Habitat.—In low grounds, United States and Canada; everywhere common.

Eupatorium purpureum Linné.—*Joe-Pye Weed, Trumpet-Weed, Gravel-Root.*

Description.—Heads cylindrical, 5- to 15-flowered, purple, in a dense compound corymb. Scales of the involucre numerous, purplish, obtuse, slightly striate, closely imbricated in several series, the outer short. Achenia glabrous and more or less glandular.

Stem stout, 3 to 7 or more feet high, simple, pubescent or glabrous. Leaves 3 to 6 in a whorl, oblong-ovate or lanceolate, pointed, veiny, scabrous or glabrous above, somewhat pubescent beneath, serrate, resinous-dotted. It flowers from July forward.

Habitat.—In low grounds, United States and Canada; everywhere common.

These two species fairly represent the medicinal activity of the genus; many other species possess similar properties.

Parts Used.—Of E. perfoliatum, the leaves—*United States Pharmacopœia;* of E. purpureum, the root—not official.

Constituents.—The official species contains a large percentage of a peculiar bitter extractive, to which its therapeutic effects are attributed, but whose chemical character is as yet undetermined. The constituents of E. purpureum have not been ascertained.

Preparations.—Of E. perfoliatum: Extractum eupatorii fluidum—fluid extract of eupatorium—*United States Pharmacopœia.* The infusion and decoction are efficient preparations, and are most commonly employed. Of E. purpureum there are commercial fluid extracts, but, as with the other species, it is most commonly administered in decoction or infusion.

Medical Properties and Uses.—Of domestic remedies few are better known or more largely used than boneset. It is tonic, diaphoretic, emetic, and cathartic, the different effects depending largely upon the size of the dose and mode of administration. The infusion, taken cold in moderate doses, is tonic, and is employed in debility of the digestive organs and in convalescence. Taken warm in large doses, the infusion or decoction produces copious diaphoresis, and is employed in the acute stages of catarrhal affections and in fevers, especially those of an intermittent or remittent type. In still larger doses the warm infusion or decoction produces emesis or catharsis; these effects are, however, seldom sought.

E. purpureum, or gravel-root, is said to be diuretic and to have been employed in urinary affections, but it has not attained an established reputation and is seldom used.

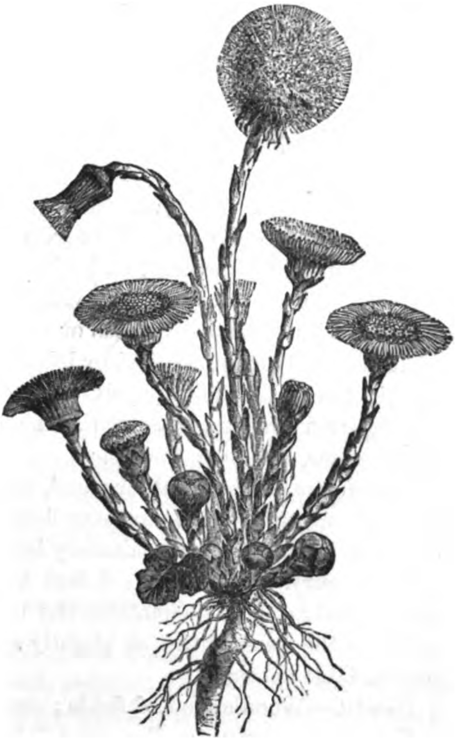


Fig. 133.—Tussilago Farfara.

TUSSILAGO.—Coltsfoot.

Tussilago Farfara Linné.—*Coltsfoot.*

Description.—Heads radiate, many-flowered; ray-flowers numerous, narrowly ligulate, pistillate, fertile, in many rows, bright yellow; tubular disk-flowers few, staminate. Scales of the involucre oblong, obtuse, nearly in a single row. Receptacle flat, naked. Style abortive in the disk-flowers, 2-cleft in the ray-flowers, the branches nearly round. Achenia of the ray-flowers cylindrical-oblong, smooth; in the disk, abortive. Pappus capillary, copious in the ray-flowers, in a single series in the disk.

A perennial herb, with a rather thick rhizome. Stems simple, often growing in tufts, erect, about 6 inches high, woolly and scaly, 1-flowered. Leaves all radical, appearing after the flowers, cordate, angular-toothed, petioled, 3 to 5 inches in diameter when fully grown, smoothish above, whitish and tomentose beneath. Heads of flowers solitary, about three-quarters of an inch in diameter, appearing in March and April.

Habitat.—In wet places and along brooks, New England, New York, and Pennsylvania. Introduced from Europe.

Part Used.—The entire plant, but chiefly the leaves—not official.

Constituents.—Bitter and mucilaginous principles.

Preparations.—It is commonly employed in decoction.

Medical Properties and Uses.—Coltsfoot is demulcent and slightly tonic. It has been employed chiefly in chronic pulmonary diseases.

ERIGERON.—FLEABANE.

Character of the Order.—Heads radiate, many-flowered, mostly hemispherical; ray-flowers very numerous, usually in more than one series, pistillate; disk-flowers tubular, perfect, the outer ones sometimes filiform and truncate, pistillate. Scales of the involucre narrow, nearly equal, slightly imbricated, in a single or double series. Receptacle flat, naked. Achenia flattened, usually pubescent, and with 2 lateral nerves. Pappus a single series of capillary bristles, often with smaller ones intermingled, or with an outer series of minute bristles or chaffy scales.

Herbs, with entire, toothed or lobed leaves. Heads solitary, corymbose or paniculate. Disk-flowers yellow; rays white, blue, or purple.

Erigeron Philadelphicum Linné (*E. purpureum* Aiton).—*Philadelphia Fleabane, Common Fleabane.*

Description.—Heads rather small, corymbose; rays very numerous and very narrow, pale reddish-purple or flesh-color, more than twice the length of the involucre. Achenia minutely hairy; pappus simple.

Stem hairy, slender, 1 to 3 feet high. Leaves numerous, thin, the lower spatulate, crenate-dentate, the upper oblong, clasping, and mostly cordate at the base, entire or slightly serrate. It blooms in summer. A quite variable species.

Habitat.—Woodlands and fields; common everywhere.

Erigeron annuum Persoon (*E. heterophyllum* Muhlenberg, *E. strigosum* Bigelow).—*Daisy Fleabane, Sweet Scabious.*

Description.—Heads corymbose; rays very numerous, nearly or quite in a single row, narrow, white or tinged with purple, not twice the length of the involucre. Pappus double, the outer a series of chaffy scales, the inner of scanty capillary bristles which are deciduous, or sometimes wanting in the rays.

An annual or biennial herb. Stem stout, 3 to 5 feet high, corymbosely branched above, hairy. Leaves coarsely and sharply serrate, the lower ovate, obtuse, tapering into a margined petiole, the upper ovate-lanceolate, acute and entire at both ends. It blooms in summer.

Habitat.—Fields and waste places; everywhere common.

Erigeron Canadense Linné.—*Canada Fleabane, Horse-Weed, Butter-Weed.*

Description.—Heads very numerous, small, cylindrical, panicled; rays numerous, inconspicuous, shorter than the involucre. Pappus simple.

Stem erect, 3 to 5 feet high, panicled above, hispid or sometimes nearly glabrous. Leaves lanceolate-linear, mostly entire, hispidly ciliate; radical leaves cut-lobed. It blooms from July till late in the autumn.

Habitat.—A common and unsightly weed, widely diffused over the world.

These three species fairly represent the whole genus, though several others have been employed medicinally.

Parts Used.—The leaves and tops—not official, though they were formerly.

Constituents.—All these species of erigeron when distilled with water yield volatile oil, E. Canadense producing a greater proportion than the others, and an article of slightly different character. Among their other constituents are tannic and gallic acids and bitter extractive.

Preparations.—Among the commercial preparations are solid and fluid extracts. The plants are most commonly administered in decoction or infusion.

Medical Properties and Uses.—There is probably little difference in the kind of effect produced by the different species of erigeron, but it is generally admitted that E. Canadense is most active. This is considered diuretic, tonic, and astringent. It has been used beneficially in diseases of the urinary organs and in dropsies. The oil is said to be useful in uterine, pulmonary, and other internal hemorrhages.

SOLIDAGO.—GOLDEN-ROD.

Solidago odora Aiton.—*Sweet-scented Golden-Rod.*

Description.—Heads few-flowered, radiate; rays 3 or 4, rather large, oblong, obtuse, pistillate; disk-flowers tubular, perfect. Scales of the involucre oblong, acute, destitute of foliaceous tips, the outer ones shorter and imbricating the others. Receptacle small, not chaffy. Achenia many-ribbed, somewhat terete. Pappus simple, of numerous scabrous capillary bristles.

Stem slender, 2 to 3 feet high, smooth or slightly pubescent below, pubescent above. Leaves linear-lanceolate, entire, reticulate-veiny, but only the mid-vein distinct, rough on the margin, otherwise smooth and shining, pellucid-dotted. Heads in racemose, one-sided panicles, appearing in September.

Habitat.—In the margins of thickets and in old fields, in sandy soil, from Maine and Vermont to Kentucky and southward.

Parts Used.—The leaves and tops—not official.

Constituents.—A fragrant volatile oil.

Preparations.—Infusion, decoction, and volatile oil.

Medical Properties and Uses.—Golden-rod is gently stimulant, diaphoretic, and carminative. The decoction and warm infusion are used in domestic practice to produce diaphoresis, to relieve colic, and to promote menstruation. The oil is used for similar purposes.

Other species of solidago have been employed medicinally, but none of them are as agreeable as this.

GRINDELIA.

Character of the Genus.—Heads many-flowered; rays pistillate, in a single series; disk-flowers tubular, perfect. Involucre hemispherical or sub-globose, the numerous scales imbricated in several series. Receptacle flat, minutely pitted. Corolla of the ray elongated; of the disk, tubular-infundibuliform, 5-toothed. Achenia obovate or oval, somewhat angled, glabrous. Pappus of 2 to 8 rigid bristles or awns, which are early deciduous.

Perennial or biennial herbs (rarely suffruticose), with branching stems. Leaves entire or serrate, somewhat pellucid- or reticulate-punctate; the radical ones usually spatulate, cauline, sessile or partly clasping. Heads solitary at the summit of the branches; flowers yellow. The heads, including the involucres, are commonly thickly coated with a glutinous or resinous varnish.

Grindelia robusta Nuttall.

Description.—Heads large, many-flowered. Involucre leafy at the base, the scales produced into recurved-squarrose, subulate-linear appendages; pappus of 2 to 5 bristles.

Stem stout, 1½ foot high, branching. Leaves oblong, obtuse, coarsely serrate, cordate-clasping, 1½ to 2 inches long. The entire plant glabrous. A variable species.

Habitat.—Common along the Pacific coast.

Grindelia squarrosa Dunal.

Description.—Heads smaller than the preceding; the involucre about one-half inch in diameter. Scales with recurved-squarrose or mostly circinate, subulate tips; pappus of 2 to 4 bristles.

Stem rather slender, 10 to 20 inches high, corymbosely branched. Leaves oblong-lanceolate, or spatulate, finely serrate, the upper entire, somewhat clasping.

Habitat.—Common on the dry plains west of the Rocky Mountains.

Several other species of grindelia resemble those above described in general appearance and probably in constituents also.

Parts Used.—The leaves and flowering tops of G. robusta—official title, Grindelia—*United States Pharmacopœia.* G. squarrosa is believed to be nearly if not quite as efficacious as the official species, and the two are often found mixed in commerce.

Constituents.—As remarked above, the flower-heads of plants of this genus are commonly coated with a glutinous or resinous varnish. The same substance is more or less diffused in the stems and leaves, and contains the active principles, namely, a peculiar volatile oil of a terebinthinate odor, resin, and a crystalline body having an alkaline reaction.

Preparations.—Extractum grindeliæ fluidum—fluid extract of grindelia.—*United States Pharmacopœia.*

Medical Properties and Uses.—The therapeutic effects of grindelia appear, in many respects, to bear a striking resemblance to those of turpentine. In moderate doses it stimulates the mucous membranes, and has been found very beneficial in chronic catarrhal affections, especially those of the respiratory tract and urinary organs. Very large doses have occasioned renal irritation. It also acts to some extent as an antispasmodic, and has proved efficacious in spasmodic asthma and in whooping-cough, especially when complicated with bronchitis.

Externally the fluid extract of G. squarrosa has been recommended as a cure for rhus-poisoning, but the author, from personal experiment, has become convinced that it acts here merely as a protective coating to the skin by virtue of its resin, and that it possesses no directly curative property. The fluid extract of the official species is quite as efficacious, as is also any other resinous varnish which has no acrid properties. Such applications are, however, unpleasant to the patient, since they discolor the skin and limit the motion of the parts affected.

INULA.—ELECAMPANE.

Inula Helenium Linné.—*Elecampane.*

Description.—Heads large, many-flowered, radiate; rays numerous, in a single series, pistillate, sometimes sterile; disk-flowers tubular, perfect. Scales of the involucre imbricate in several series, the outer broadly ovate, foliaceous; the inner obovate-spatulate, obtuse. Receptacle flat, or somewhat convex, naked. Achenia 4-sided, glabrous. Pappus simple, of capillary, slightly scabrous bristles.

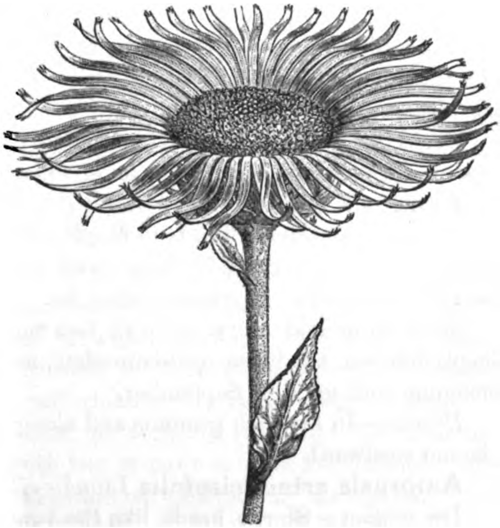


FIG. 184.—Inula Helenium.

A stout perennial, 3 to 5 feet high. Leaves large, velvety-tomentose beneath, denticulate, the radical ones ovate, tapering to a petiole, the cauline ones partly clasping. Heads solitary at the summit of corymbose peduncles, yellow, appearing late in summer.

Habitat.—A native of the Eastern Continent, but naturalized here, growing along roadsides and in waste places.

Part Used.—The root—*United States Pharmacopœia.*

Constituents.—A little volatile oil, an acrid resin, a bitter principle, waxy matter, and *inulin*, the last-named being a substance somewhat resembling starch.

Preparations.—It is generally administered in decoction, though there are commercial extracts, etc.

Medical Properties and Uses.—Elecampane was formerly considered diaphoretic, diuretic, expectorant, and emmenagogue, but at present it is little esteemed except among the laity. It is probably stimulant and tonic, and given in hot decoction capable of producing some of the effects attributed to it.

AMBROSIA.—RAG-WEED.

Character of the Genus.—Sterile and fertile flowers in different heads upon the same plant, the former in spikes or racemes and the latter in the axils of the leaves or at the base of the sterile racemes or spikes. Sterile heads of 5 to 20, funnel-form, staminate flowers; involucre flattish or top-shaped, of 7 to 12 scales united into a cup. Fertile flowers: involucre globose-ovoid, oblong or turbinate, closed, pointed, usually armed with 4 to 8 tubercles or horns in a single series, 1-flowered. Achenia ovoid; pappus absent.

Herbs, or rarely shrubby plants, with opposite or alternate, lobed or dissected leaves, and inconspicuous greenish or yellowish flowers.

Ambrosia trifida Linné.—*Great Rag-Weed.*

Description.—Sterile heads in single or panicled racemes or spikes, the involucre regular, 3-ribbed. Fruit with a conical-pointed apex, 6-ribbed, the ribs terminating in cristate tubercles.

Stem stout and hairy, 4 to 12 feet high. Leaves rough and hairy, deeply 3-lobed, the lobes oval-lanceolate, serrate, acuminate. An annual, blooming in August or September.

Habitat.—In low rich grounds and along streams from Canada to Georgia and westward.

Ambrosia artemisiæfolia Linné.—*Rag-Weed, Hog-Weed.*

Description.—Sterile heads like the preceding, but with the involucre not ribbed. Fertile flowers solitary or clustered toward the base of the sterile spikes or racemes, or in the axils of the upper leaves. Fruit globose or obovoid, nearly glabrous, pointed, armed with 6 short acute spines or teeth.

An annual branching herb, 1 to 3 feet high, hairy or roughish-pubescent. Leaves bipinnatifid, the uppermost simply pinnatifid, smoothish or glabrous above, paler or whitish beneath.

Habitat.—In waste places everywhere; a most pestiferous weed.

Parts Used.—The leaves and tops—not official.

Constituents.—Both species have a disagreeable odor and an aromatic bitter taste. The leaves of *A. trifida* are readily eaten by some of the domestic animals, but the other species appears to be too disagreeable. Their constituents have not been ascertained.

Preparations.—They are commonly used in decoction.

Medical Properties and Uses.—These plants are said to be stimulant, tonic, and astringent. A decoction has been used, chiefly in domestic practice, as a topical astringent in chronic catarrhal affections.

Of late years *A. artemisiæfolia* has attracted considerable attention on account of its real or assumed agency in the production of hay-fever. The plant produces pollen in great abundance, which is extremely irritating to the air-passages of many people, and is capable of exciting asthmatic attacks in susceptible persons. Now as the weed is so very abundant, and its time of flowering coincident with the greatest development of hay-fever, the relation of cause and effect has been asserted by many writers. That it may be so in a certain proportion of cases is quite probable, but that its influence in this direction has been overrated is still more probable. The pollen of all plants is irritating to the air-passages of sensitive people, but probably little more so than any other dust of an organic character; and the proportion which rag-weed pollen in the air of any specified locality bears to that of all other plants combined must be very small indeed. Much less still must its proportion be to other pollen and organic dust in the air of cities, where this affection has become endemic—and fashionable.

HELIANTHUS.—SUNFLOWER.

Helianthus annuus Linné.—*Common Sunflower.*

Description.—Heads large, many-flowered, radiate; the rays numerous, neutral, yellow; the disk-flowers brownish, perfect. Scales of the involucre with foliaceous tips, imbricated in 3 or more series. Receptacle broad and flat, with persistent chaff which embraces the 4-angled, flattened achenia. Pappus very deciduous, of 2 chaffy scales on the principal angles of the achenium, often with two or more smaller intermediate ones.

A tall rough annual herb, in common cultivation. Leaves alternate, triple-ribbed, ovate, or the lower cordate.

Habitat.—The sunflower is a native of tropical America, but has long been cultivated here and is sparingly naturalized in waste places.

Many of the indigenous species of helianthus are but little less striking than this in appearance, and possess similar properties.

Part Used.—The seed—not official.

Constituents.—A large percentage of bland fixed oil.

Preparations.—The oil.

Medical Properties and Uses.—Sunflower seeds are said to be diuretic and expectorant, but there is little reason for believing them actively medicinal.

HELENIUM.—SNEEZE-WEED.

Helenium autumnale Linné.—*Sneeze-Weed.*

Description.—Heads many-flowered, radiate; the rays several, in a single series, 3- to 5-cleft at the summit, fertile, yellow, reflexed soon after expansion. Involucre small, reflexed, the scales linear or awl-shaped, in 2 series. Receptacle convex, globose, or oblong, naked. Achenia top-shaped, ribbed. Pappus of 5 to 8 membranous, 1-nerved scales.

An erect, nearly smooth perennial herb. Stem 1 to 3 feet high, angled, branching. Leaves lanceolate, toothed, decurrent on the stems and branches. Heads corymbed, showy, appearing in September.

Habitat.—In moist places along streams; common everywhere.

Parts Used.—The leaves and flowers—not official.

Constituents.—Unknown.

Preparations.—Used in powder or decoction.

Medical Properties and Uses.—The common name of the plant indicates the popular estimation of it. The powdered flowers particularly have been used as an errhine, and a decoction is said to be tonic and diaphoretic.

MARUTA.—MAY-WEED.

Maruta Cotula De Candolle.—*May-Weed, Wild Chamomile.*

Description.—Heads many-flowered, radiate; rays neutral, white, soon reflexed; disk-flowers tubular, perfect. Involucre hemispherical, the scales imbricated, shorter than the disk, with whitish margins. Receptacle conical, chaffy throughout, or only at the summit. Achenia obovoid, ribbed, glabrous. Pappus none.

An annual, one-half to one foot or more in height. Leaves tripinnately divided, the ultimate segments very narrowly linear. Heads solitary, terminating the branches. It flowers from midsummer till late in autumn.

Habitat.—Common everywhere in waste places.

Part Used.—The herb—formerly official; it was dropped from the Pharmacopœia in 1880.

Constituents.—Volatile oil, tannic, valerianic, and oxalic acids, bitter extractive, etc.

Preparations.—Commonly employed in infusion.

Medical Properties and Uses.—May-weed has a very disagreeable odor, and, when fresh, a bitter, acrid taste. Therapeutically it acts like chamomile but is much less agreeable. It is seldom used except by the laity.

ANTHEMIS.—CHAMOMILE.

Anthemis nobilis Linné.—*Chamomile.*

Description.—Heads and flowers as in maruta, except that the rays are pistillate. Achenia terete, striate, or smooth. Pappus none, or a minute crown.

A perennial, somewhat downy herb. Leaves 1- to 2-pinnately divided, the ultimate segments as in maruta but fewer and more compact.

Habitat.—Chamomile, a native of Europe, has been long cultivated in gardens here, and has become naturalized to a very limited extent in New Jersey and Delaware.

Part Used.—The flowers—official name, Anthemis—*United States Pharmacopœia.*

Constituents.—Volatile oil, a bitter principle, and common vegetable constituents.

Preparations.—None are official. It is most commonly employed in infusion or decoction. The volatile oil and an extract are official in Britain.

Medical Properties and Uses.—Chamomile is a mild stimulant and tonic, and one particularly suited to debility of the digestive organs. The warm infusion is frequently used as a diaphoretic, and, in large doses, as an emetic. Fomentations of chamomile are employed as a soothing application in sprains, bruises, colic, abscesses, and local pains generally.

ACHILLEA.—YARROW.

Achillea Millefolium Linné.—*Yarrow, Milfoil.*

Description.—Heads many-flowered, radiate; the rays 4 or 5, fertile, white, rarely rose-colored. Involucre oblong, the scales imbricated. Receptacle chaffy, flattish. Achenia oblong, flattened, margined. Pappus none.

A perennial herb, 1 to 3 feet high. Leaves oblong or linear in outline, bipinnately parted, the ultimate divisions 3- to 5-cleft, crowded. Heads in a compound, flat-topped corymb, appearing throughout the summer.

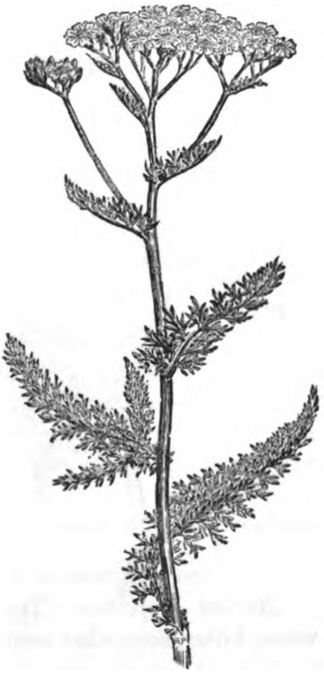


FIG. 135.—Achillea Millefolium.

Habitat.—Fields and waste places; everywhere common.

Part Used.—The herb—not official.

Constituents.—A volatile oil, a bitter principle termed *achillein*, and common vegetable constituents.

Preparations.—Infusion, expresssd juice, and volatile oil.

Medical Properties and Uses.—Yarrow is said to be stimulant, tonic, and astringent, and to exert a special influence upon the pelvic organs. It has been employed in digestive disorders, in menstrual irregularities, in hemorrhages due to relaxed conditions of mucous membranes, in catarrhal affections, etc.

TANACETUM.—TANSY.

Tanacetum vulgare Linné.—*Tansy.*

Description.—Heads many-flowered, nearly discoid, all fertile; the marginal flowers in a single series, 3- to 4-toothed. Scales of the involucre imbricated, dry. Receptacle convex, naked. Achenia angled or ribbed with a large epigynous disk. Pappus minute or none.

An herbaceous perennial, 2 to 3 feet high. Leaves nearly glabrous, bipinnately parted, the segments cut-toothed. Heads yellow, in a dense corymb, appearing in summer.

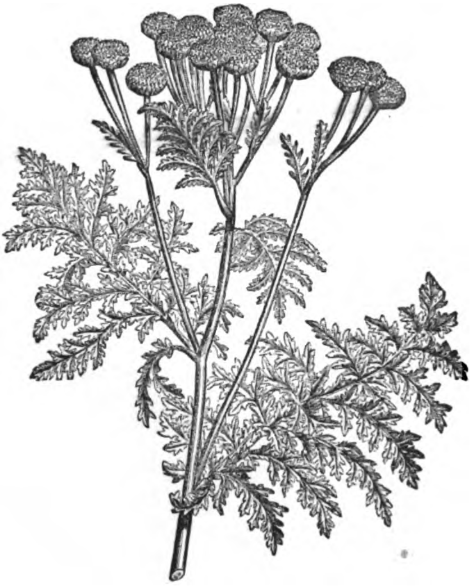


FIG. 186.—Tanacetum Vulgare.

Habitat. — Indigenous to Europe, but freely naturalized about dwellings and in waste places.

Parts Used. — The leaves and tops—*United States Pharmacopœia.*

Constituents.—A volatile oil, a bitter principle termed *tanacetin*, and common vegetable constituents.

Preparations.—The infusion and volatile oil.

Medical Properties.—Tansy has a peculiar strong fragrant odor and a warm, bitter, somewhat acrid and aromatic taste. It is commonly employed in domestic practice to stimulate menstruation. The oil appears to be largely used as an abortifacient, and there are upon record numerous cases in which it has been used for this purpose with fatal effect. The bruised leaves are often applied locally for the relief of colic pains, bruises, sprains, etc. A spirituous infusion is sometimes employed in domestic practice in intermittent fever.

ARTEMISIA.—WORMWOOD.

Character of the Genus.—Heads many-flowered, discoid; flowers all tubular, the marginal ones pistillate, though sometimes all are perfect. Scales of the involucre imbricated, with slightly scarious margins. Receptacle small, naked. Achenia obovate, rounded or narrow at the top; pappus none.

Herbs or shrubs, with small heads in panicled spikes or racemes; flowers yellow or purplish.

A genus comprising, in North America, a large number of species, few of which, however, have been employed medicinally. All of them possess, to a greater or less extent, bitter and aromatic properties. The species described below, though not indigenous, well represents the medicinal virtues of the genus.

Artemisia Absinthium Linné.—*Wormwood.*

Description.—Marginal flowers pistillate; the others perfect. Heads numerous, densely clustered, hemispherical, nodding, yellow. Stem somewhat shrubby, 2 to 4 feet high, branching, silky-hoary. Leaves 2- to 3-pinnately parted, the lobes lanceolate, obtuse.

Habitat.—Indigenous to the Eastern Continent, but long cultivated and sparingly naturalized here.

Parts Used.—The leaves and tops—*United States Pharmacopœia.*

Constituents.—Volatile oil, a bitter principle termed *absinthin,* and common vegetable constituents such as tannin, starch, gum, etc.

Preparations.—Wormwood enters into the official *Vinum Aromaticum,* but there are no official preparations of the plant itself. It is generally employed in infusion.

Medical Properties and Uses.—Wormwood is stimulant and tonic. It has been employed chiefly in debility of the digestive organs, as atonic and flatulent dyspepsia. The volatile oil of wormwood in large doses produces great cerebral disturbance with epileptiform convulsions, and may even cause death. It is seldom or never employed medicinally, but enters into the composition of a French liqueur called *absinthe.*

Externally fomentations of wormwood are often used in bruises, sprains, etc.

GNAPHALIUM.—CUD-WEED.

Gnaphalium polycephalum Michaux.—*Common Everlasting.*

Description.—Heads many-flowered, all tubular; the outer pistillate, very slender, generally in several series; the central perfect. Scales of the involucre ovate and oblong, rather obtuse, whitish. Receptacle flat, naked. Achenia terete. Pappus a single series of rough, capillary bristles.

An erect, woolly herb, 1 to 2 feet high. Leaves lanceolate, tapering at the base, with undulate margins, nearly glabrous above, woolly tomentose beneath. Heads clustered at the summit of the paniculate-corymbose branches, ovate-conical before expansion, then obovate; corolla whitish or yellowish. It flowers in August and September, the mature heads remaining a long time on the stem. The whole plant is fragrant.

Habitat.—In woods and old fields; everywhere common.

Parts Used.—The flowers and tops—not official.

Constituents.—A bitter principle and a little volatile oil.

Preparations.—Used in infusion.

Medical Properties and Uses.—Said to be tonic. Used in catarrhal affections.

Several other indigenous and exotic species possess similar properties.

ERECHTHITES.—FIRE-WEED.

Erechthites hieracifolia Rafinesque.—*Fire-Weed.*

Description.—Heads many-flowered; flowers all tubular and fertile, the outer pistillate, slender, the inner perfect. Scales of the cylindrical involucre in a single series, linear, acute, with a few bracteoles at the base. Receptacle naked. Achenia oblong, striate, tapering to the apex. Pappus copious, of fine capillary bristles.

An erect, coarse, and often hairy annual, 1 to 5 feet high. Leaves alternate, lanceolate-oblong, acute, unequally and sharply cut-toothed, sessile; the upper often auricled at the base. Heads corymbose; flowers whitish, appearing from July to September.

Habitat.—Common in recent clearings, often covering ground which has been burned over almost to the exclusion of other plants.

Part Used.—The flowering tops—not official.

Constituents.—Fire-weed has a peculiar aromatic and somewhat disagreeable odor, and a pungent, bitterish taste. It yields a volatile oil of similar odor and taste, upon which its medicinal virtues are believed to depend.

Preparations.—Volatile oil and infusion.

Medical Properties and Uses.—Fire-weed is said to be tonic, astringent, and alterative, and to exert a special influence upon the mucous surfaces. It has been highly praised as a remedy for dysentery.

SENECIO.—GROUNDSEL

Senecio aureus Linné.—*Golden Ragwort, Squaw-Weed.*

Description.—Heads many-flowered, radiate; rays 8 to 12, pistillate, golden yellow; disk-flowers perfect. Scales of the involucre in a single series, with a few bracteoles at the base. Receptacle flat, naked. Achenia glabrous. Pappus of numerous soft and slender capillary bristles.

A perennial herb, 1 to 2½ feet high. Radical leaves orbicular or roundish-ovate, mostly cordate, crenate-serrate, petiolate; the lower cauline lyrate, the upper lanceolate, cut-pinnatifid, sessile or partly clasping. Heads in an umbel-like corymb, appearing in May and June. A very variable species.

Habitat.—In swamps, marshes, and wet places; common everywhere.

Part Used.—The entire plant—not official.

Constituents.—Unknown.

Preparations.—Commonly employed in decoction. There are commercial fluid extracts and a so-called *senecin.*

Medical Properties and Uses.—Said to be diaphoretic, diuretic, tonic, and emmenagogue. Considerably used and praised—by eclectics.

Several other species of senecio are said to possess similar properties.

LAPPA.—BURDOCK.

Lappa officinalis Allioni.—*Burdock.*

Description.—Heads many-flowered; the flowers all tubular, perfect, the corolla regularly 5-cleft, 10-nerved. Involucre globular, the imbricated scales coriaceous and appressed at the base, subulate and spreading above, tipped with a hooked appendage. Receptacle flat, fleshy, and somewhat bristly. Achenia oblong, compressed, glabrous, wrinkled transversely. Pappus of numerous short rough bristles, not united at the base, deciduous.

A coarse, ill-scented, biennial herb, 1 to 4 feet high. Lower leaves very large, cordate, slightly undulate on the margins, more or less tomentose beneath, smoother above; the upper ovate. Heads relatively small, solitary or somewhat corymbose; flowers purple, varying to white, appearing from July to autumn.

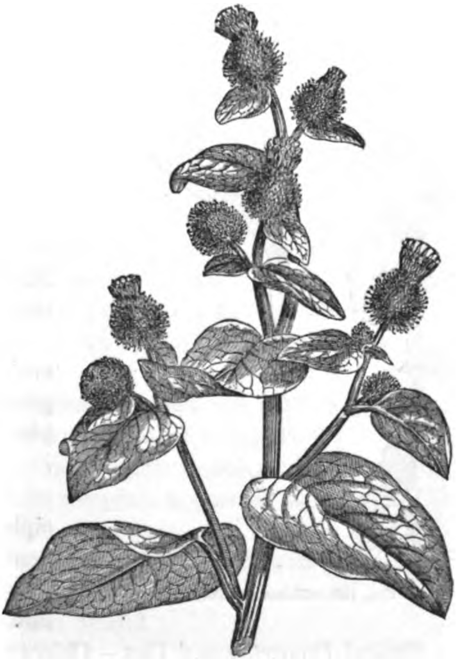


FIG. 187.—Lappa officinalis.

Habitat.—Introduced from Europe; common in waste places everywhere.

Parts Used.—The root—*United States Pharmacopœia.* The seeds are also employed, but are not official.

Constituents.—Inulin, a bitter principle, and common vegetable constituents.

Preparations.—Commonly employed in decoction.

Medical Properties and Uses.—Burdock, though chiefly used by the laity, is highly esteemed by some of the profession as a diuretic and alterative. It is, perhaps, more frequently used in rheumatism than in any other disease, but is also recommended in chronic cutaneous diseases, catarrhal affections, syphilis, and scrofula. In the form of an ointment or liniment it is used as an application to burns, ulcers, etc.

CICHORIUM.—Chicory.

Cichorium Intybus Linné.—*Chicory, Succory.*

Description.—Heads several-flowered; the flowers all ligulate, perfect. Involucre double, the inner of 8 to 10 scales, the outer of 5, half as long, spreading. Achenia oblong, smooth or slightly ribbed. Pappus of numerous short chaffy scales forming a crown.

A branching perennial herb, 2 to 3 feet high, with a large deep root. Leaves alternate, oblong or lanceolate, partly clasping, the lower lyrately runcinate; those of the rigid flowering branches minute. Heads sessile, 2 or 3 together, axillary and terminal. Flowers bright blue or purple, appearing from July to October.

Habitat.—Indigenous to the Eastern Continent, but naturalized here, growing along roadsides and in waste places.

Part Used.—The root—not official.

Constituents.—Inulin, a bitter principle, and ordinary vegetable constituents.

Preparations.—Commonly used in infusion.

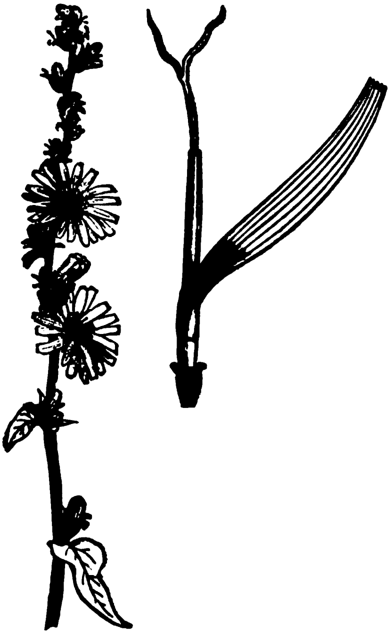


Fig. 188.—Cichorium Intybus.

Medical Properties and Uses.—Chicory is said to increase the appetite and aid digestion. Though formerly used medicinally, it is of importance now merely as an adulterant of coffee. For this purpose the root is roasted and ground in the same manner as coffee, with which it is afterward mixed in large proportion. When thus treated chicory in infusion has a bitterness, possibly somewhat resembling that of coffee, but it is wholly destitute of the aromatic flavor of the latter; and, moreover, infusion of chicory does not produce the agreeable stimulation of coffee, and altogether serves as a very poor substitute for it.

HIERACIUM.—Hawk-Weed.

Hieracium venosum Linné.—*Rattlesnake-Weed.*

Description.—Heads small, about 20-flowered; the flowers all ligulate, perfect. Involucre cylindrical, the inner scales in a single series, the outer few and short. Achenia linear. Pappus a single series of tawny, fragile, and rough capillary bristles.

A perennial herb. Stem or scape 1 to 2 feet high, naked or with a single leaf, smooth and slender, forking above into a diffuse corymb. Radical leaves obovate or spatulate-oblong, entire or obscurely denticulate, slightly petioled, smooth and pale, often purplish and glaucous beneath, with purplish veins, the margins and often the under side of the mid-vein hairy. Flowers yellow, appearing from May to July.

Habitat.—In dry soil, especially in pine regions; common.

Part Used.—The entire plant—not official.

Constituents.—Unknown.

Preparations.—Infusion and expressed juice.

Medical Properties and Uses.—Said to be tonic, astringent, and expectorant, and to be an antidote to the bites of poisonous serpents. Little of a positive character is known of it.

NABALUS.—Rattlesnake-Root.

Nabalus albus Hooker.—*White Lettuce, Rattlesnake-Root.*

Description.—Heads 6- to 12-flowered; the flowers all ligulate and perfect. Involucre of about 8 scales, purplish. Achenia short, linear-oblong, striate. Pappus copious, of cinnamon-colored, rough capillary bristles.

A perennial herb. Stem smooth and glaucous, 2 to 4 feet high, corymbose-panicled at the summit. Leaves angulate or triangular-halberd-form, sinuate-toothed, or 3- to 5-cleft; the uppermost oblong and undivided. Flowers pendulous, greenish-white or purplish, appearing in autumn. The whole plant abounds in a milky juice.

Habitat.—Open grounds and borders of woods; common in the Northern States and Canada.

Part Used.—The entire plant—not official.

Constituents.—Unknown.

Preparations.—Infusion and expressed juice.

Medical Properties and Uses.—The entire plant has a bitter taste, which is most intense in the root. On this account it has been employed as a tonic in domestic practice. The fresh juice is considered vulnerary and has been applied to wounds, especially to snake-bites.

TARAXACUM.—DANDELION.

Taraxacum Dens-leonis Desfontaines.—*Dandelion.*

Description.—Heads many-flowered; flowers all ligulate, perfect. Involucre double; the outer of small short scales, reflexed; the inner of longer erect scales. Receptacle naked. Achenia terete, oblong, ribbed, the apex prolonged into a slender beak. Pappus copious, of long, white, capillary bristles.

A biennial or perennial herb, with a long, deep root. Leaves all radical, oblong or lanceolate, nearly entire, or sinuate-toothed or runcinate. Scapes slender, hollow, bearing a single head of yellow flowers. It blooms throughout the spring and summer.

Habitat.—Common everywhere.

Part Used. — The root—*United States Pharmacopœia.*

Constituents.—A bitter principle termed *taraxacin*, inulin, resin, saccharine matter, and common vegetable constituents.

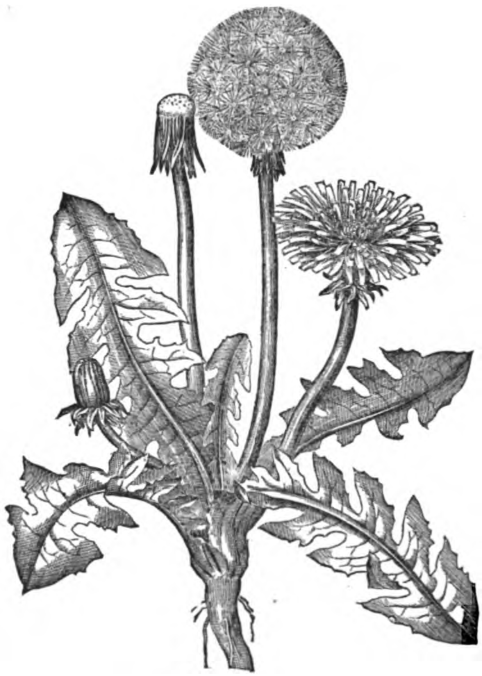


FIG. 189.—Taraxacum Dens-leonis.

Preparations. — Extractum taraxaci — extract of taraxacum; extractum taraxaci fluidum—fluid extract of taraxacum.—*United States Pharmacopœia.* The expressed juice and decoction are also employed.

Medical Properties and Uses.—Taraxacum is slightly tonic, diuretic, and aperient. It is supposed to act especially upon the liver, and is used chiefly in dyspepsia associated with torpor of this organ.

LOBELIACEÆ.

Character of the Order.—Herbs, with milky juice, and alternate, exstipulate leaves. Calyx adherent to the ovary, commonly 5 lobed. Corolla irregularly 5-lobed, often deeply cleft. Stamens 5, free from the corolla, and united into a tube, commonly by their filaments, but always by their anthers. Style 1; stigma often fringed. Fruit capsular, 1- or more-celled, opening at the top; seeds numerous.

An order comprising many plants possessed of acrid and narcotic properties. Represented in North America by the genus

LOBELIA.

Character of the Genus.—Calyx 5-cleft, with a short, variously shaped tube. Corolla-tube slit along the upper side; the limb divided into 2 lips, the upper with 2 erect lobes, the lower spreading, 3-cleft. Two of the anthers bearded at the top. Pod 2-celled, many-seeded. Annual or perennial herbs. Flowers axillary or in bracted racemes.

Lobelia inflata Linné.—*Indian Tobacco.*

Description.—Calyx without auricles at the sinuses. Corolla small, pale blue. Pod inflated.

An annual or biennial herb. Stem angled or striate, paniculately branched, 9 to 18 inches high, pubescent. Leaves ovate or oblong, the upper ones diminishing into leaf-like bracts. Flowers small, in racemose spikes, appearing from midsummer to autumn.

Habitat. — Common along roadsides and in old fields, generally in dry soil.

Lobelia syphilitica Linné.—*Great Lobelia.*

Description.—Calyx hairy, half the length of the corolla, the sinuses auriculate, its tube hemispherical. Corolla much larger than in the preceding species, blue, varying to white.

A perennial herb. Stem simple, 1 to 3 feet high, somewhat hairy, leafy to the top. Leaves thin, acute at both ends, irregularly serrate. Flowers crowded in a dense spike or raceme, appearing late in summer.

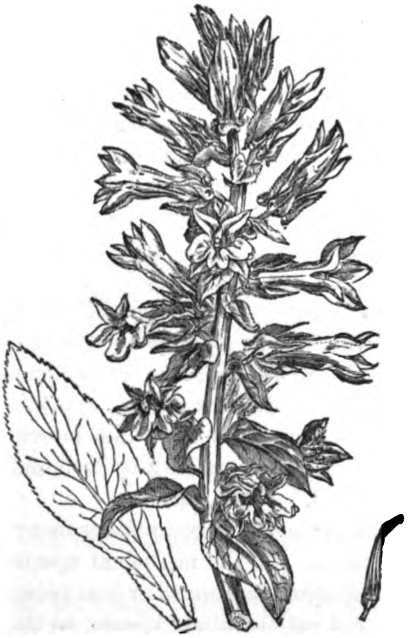


Fig. 140.—Lobelia syphilitica.

Habitat.—In moist places; common.

Lobelia cardinalis Linné.—*Cardinal Flower.*

Description.—Flowers similar in form to the preceding but of an intense scarlet color.

A perennial herb. Stem smooth or slightly pubescent, simple, 2 to 4 feet high. Leaves lanceolate, denticulate. Flowers showy, in an elongated, somewhat one-sided raceme, appearing late in summer.

Habitat.—In swampy places; common.

Of the three species described above, the first-named is the only one which is medicinally important. The others, though strikingly beautiful, L. cardinalis especially so, are of little interest.

Parts Used.—The leaves and tops of L. inflata—*United States Pharmacopœia.*

Constituents.—Lobelia has an acrid and irritating taste, somewhat resembling that of tobacco, and a slightly irritating odor when bruised or powdered. It contains an odorous volatile principle, a peculiar alkaloid, termed *lobeline*, *lobelic acid*, and common vegetable principles.

Preparations.—Acetum lobeliæ—vinegar of lobelia; extractum lobeliæ fluidum—fluid extract of lobelia; tinctura lobeliæ—tincture of lobelia. —*United States Pharmacopœia.*

Medical Properties and Uses.—In full doses lobelia produces severe nausea, obstinate vomiting, and great prostration. In overdoses the prostration becomes extreme, there is failure of voluntary motion, followed by stupor, coma, and not unfrequently convulsions and death. Though formerly much used for emetic effect by empirics, dangerous effects were so often produced that it is now seldom employed in this manner. It is chiefly employed in spasmodic affections of the air-passages, as spasmodic laryngitis and spasmodic asthma. In the latter disease it often produces the happiest effects.

ERICACEÆ.

Character of the Order.—Shrubs, rarely herbs, with opposite, alternate or whorled, commonly evergreen leaves. Flowers regular or nearly so; calyx 4- to 5-lobed, free or adherent to the ovary; corolla 4- to 5-lobed, rarely with distinct petals; stamens as many or twice as many as the lobes of the corolla, free from but inserted with it; anthers 2-celled, commonly appendaged or opening by terminal chinks or pores; style 1; ovary 3- to 10-celled. Fruit various.

A large order, comprising many plants of medicinal and economic importance. Of the medicinal species, some possess valuable diuretic properties, others are more or less poisonous, and their therapeutic applications are not yet definitely known, so that, in the present state of science, it is not possible to formulate, in general terms, the medicinal properties of the order as a whole.

As represented in North America, the order comprises four well-marked sub-orders, namely:

VACCINIEÆ—ERICINEÆ—PYROLEÆ—MONOTROPEÆ,

the second and third alone comprising medicinal species.

SUB-ORDER ERICINEÆ.

Character of the Sub-Order.—Calyx free from the ovary. Corolla monopetalous or sometimes polypetalous, hypogynous. Shrubs or small trees.

ARCTOSTAPHYLOS.—BEARBERRY.

Arctostaphylos Uva-ursi Sprengel.—*Uva-ursi, Bearberry.*

Description.—Calyx 5-parted, persistent, the lobes roundish. Corolla ovate, urn-shaped, rose-color, pellucid at the base, hairy inside, with 5 short, acute, recurved teeth. Stamens 10, included; anthers large, with 2 pores at the summit, laterally 2-awned, the awns reflexed. Ovary surrounded with 3 fleshy scales. Fruit drupaceous, depressed-globose, the size of a large pea, red, with a mealy insipid pulp, and containing 5 seed-like nuts.

A small trailing shrub. Root thick, woody, creeping. Stems numerous, trailing and spreading, the sterile branches often 2 to 3 feet long. Leaves evergreen, scattered, cuneate-obovate, three-fourths of an inch long, variable in breadth, entire, coriaceous, shining. Flowers drooping in small terminal racemes, appearing in April and May.

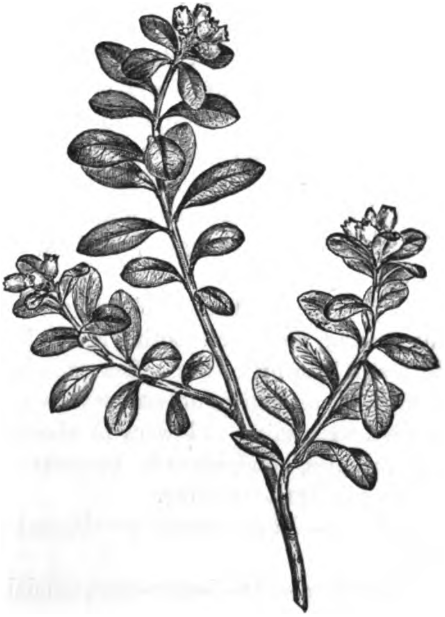


FIG. 141.—Arctostaphylos Uva-ursi.

Habitat.—Dry sandy soils, rocks and bare hills, from New Jersey to Wisconsin and northward. Found also in Northern Europe and Asia.

Parts Used.—The leaves—official name, Uva-ursi—*United States Pharmacopœia.*

Constituents.—Three crystalline principles, namely, *arbutin*, *ericolin*, and *ursone*, have been found in uva-ursi and in other ericaceous plants. In addition to these principles there occur gallic and tannic acids and other common vegetable constituents.

Preparations.—Extractum uvæ-ursi fluidum—fluid extract of uva-ursi.—*United States Pharmacopœia.* In many cases the drug is best administered in infusion.

Medical Properties and Uses.—Uva-ursi is astringent and tonic, and is generally credited with a specific action upon the urinary tract. In a condition of health it produces no diuretic effect, though it is said to do so in certain cases of disease. During its administration the urine acquires a dark color and a peculiar odor. It is chiefly used in chronic urinary diseases, as pyelitis and cystitis, calculous affections, gleet, and incontinence of urine. It has also been used advantageously in leucorrhœa, diarrhœa, chronic bronchitis, and in passive hemorrhages.

EPIGÆA.—TRAILING ARBUTUS.

Epigæa repens Linné.—*Trailing Arbutus, Ground Laurel, May-Flower.*

Description.—Calyx deeply 5-parted, colored, with three bracts at the base; the lobes ovate, acute, smooth. Corolla tubular, salver-form, rose-color or nearly white, the limb 5-parted, somewhat spreading; the lobes ovate, obtuse, very hairy inside toward the base. Stamens 10, shorter than the corolla; filaments hairy at the base; anthers linear, opening longitudinally. Style straight; stigma obtusely 5-lobed. Capsule depressed-globular, obtusely 5-angled, 5-celled, many-seeded, covered with the persistent calyx.

A prostrate or trailing shrubby perennial. Stem woody, spreading on the ground, and often rooting at the joints, clothed, as are the petioles also, with stiff brownish hairs. Leaves evergreen, coriaceous, 1 to 2 inches long, cordate-ovate, entire, obtuse or with a short mucronate point, sprinkled or fringed with hairs. Flowers in short dense axillary and terminal fasciculate racemes, conspicuously bracteate, very fragrant and ornamental, appearing in April and May.

Habitat.—In dry sandy woods, and on hill-sides, especially in pine regions.

Part Used.—The leaves—not official.

Constituents.—Similar to, if not identical with those of uva-ursi, which see.

Preparations.—Decoction and infusion.

Medical Properties and Uses.—This plant has been used as a substitute for uva-ursi, and, it is claimed, with satisfactory results.

GAULTHERIA.—AROMATIC WINTERGREEN.

Gaultheria procumbens Linné.—*Wintergreen, Partridge-Berry, Tea-Berry, Checkerberry.*

Description.—Calyx 5-lobed, becoming fleshy and baccate, and then covering the capsule. Corolla cylindrical-ovoid, white, 5-toothed. Stamens 10, shorter than the corolla; anthers 2-lobed, opening longitudinally, 2-

awned at the summit. Style filiform; stigma undivided, obtuse. Capsule depressed-globular, 5-celled, many-seeded, completely enclosed in a large red, berry-like calyx.

A small, creeping, shrubby, or almost herbaceous perennial. Stem creeping extensively just beneath the surface of the ground, and sending up erect branches 3 to 5 inches high. Leaves alternate, evergreen, coriaceous, 1 inch long, obovate, cuneate at the base, remotely and setaceously denticulate, 3 to 6 placed near the summit of each branch. Flowers axillary, on pedicels nearly half an inch long, with 2 bracteoles near the flower, mostly solitary, nodding, appearing in summer. Fruit edible, but rather dry.

Habitat.—In woods, and rather dry sandy swamps; common.

Part Used.—The leaves—*United States Pharmacopœia.*

Constituents.—Their most important constituent is a highly aromatic volatile oil; they also contain tannin, and the crystalline principle found in uva-ursi, which see.

Preparations.—Oleum gaultheriæ—oil of gaultheria (*oil of wintergreen*). Spiritus gaultheriæ—spirit of gaultheria (*essence of wintergreen*).—*United States Pharmacopœia.*

Medical Properties and Uses.—Until recently, wintergreen was used only as an aromatic stimulant, or as a flavoring agent. Since the introduction of salicylic acid as a remedy for rheumatism, however, the oil of wintergreen, which contains a large percentage of this acid, has been used medicinally in the same disease. In some cases the results have been gratifying, but, in general, the acid itself, or some of its salts, are much more efficient. From a somewhat limited experience, the author finds that frequent doses of the oil often become insupportable, owing to its high flavor, and hence he has found it difficult to persist in the use of the remedy long enough to secure permanent curative effects.

ANDROMEDA.

Andromeda Mariana Linné.—*Stagger-Bush.*

Description.—Calyx deeply 5-parted, the segments acute. Corolla ovoid-cylindrical, about one-half inch long, white, or pale-rose color, 5-cleft. Stamens 10; filaments linear, lanceolate, doubly recurved, hairy; anthers oblong, awnless, the cells opening by a large oblique terminal orifice. Style shorter than the corolla, tapering; stigma obscurely lobed. Capsule conical, somewhat contracted at the base, 5-celled, 5-angled, many-seeded; the sutures very prominent, at length separating from the valves.

A shrub 2 to 3 feet high, with a few erect branches; bark gray, sprinkled with black dots. Leaves 2 to 3 inches long, oval or oblong, often obtuse at the apex, acute at the base, entire, coriaceous, sprinkled with black dots underneath, deciduous. Flowers large and showy, nodding, from axillary scaly buds, often forming elongated racemes; the fascicles 4- to 10-flowered; they appear in June and July.

Habitat.—In low sandy soil, from Rhode Island southward, along the coast.

This, and some other indigenous species of andromeda, are said to be poisonous to lambs and calves, producing symptoms termed *staggers*. The plants are interesting from this fact, and from their being apparently analogous to *Kalmia*, which see.

OXYDENDRON.—SORREL TREE.

Oxydendron arboreum De Candolle (*Andromeda arborea* Linné).—*Sorrel Tree, Sour Wood.*

Description.—Calyx without bractlets, very deeply 5-cleft, the segments valvate in the bud. Corolla ovate, 5-toothed puberulent. Stamens 10; anthers linear, awnless; the cells tapering upward, and opening by a long chink. Capsule oblong-pyramidal, 5-celled, 5-valved, many-seeded.

A tree 15 to 50 feet high. Leaves alternate, oblong-lanceolate, acuminate, serrulate, at first downy, then smooth, on slender petioles, deciduous. Flowers in long one-sided racemes, clustered in an open panicle, terminating the branches of the season; they appear in June and July.

Habitat.—In rich woods from Pennsylvania to Georgia and westward. Though commonly a small tree, Michaux states that in the fertile valleys at the foot of the lofty mountains of North Carolina he measured specimens which were 50 feet high and 12 or 15 inches in diameter.

Part Used.—The leaves—not official.

Constituents.—Unknown.

Preparations.—Infusion and decoction.

Medical Properties and Uses.—The leaves of this tree have a pleasant acidulous taste, and are said to be tonic, refrigerant, and diuretic. They are used in domestic practice, in the form of infusion or decoction, as a refrigerant drink in fevers.

KALMIA.—AMERICAN LAUREL.

Kalmia latifolia Linné.—*Calico-Bush, Mountain Laurel, Spoon-Wood.*

Description.—Calyx small, 5-parted, persistent, with oval, acute segments. Corolla-tube short, cylindrical, the limb spreading, and terminating in an erect, 5-parted margin. Stamens 10; anthers lodged in depressions in the corolla in such a manner that as the flower expands the filaments are bent strongly outward; when the flower is fully expanded the anthers are released, and the filaments recoil elastically, throwing the anthers over upon the stigma. Pod globose, 5-valved, 5-celled, many-seeded.

An evergreen shrub, 4 to 20 feet high. Leaves mostly alternate, coriaceous, bright green both sides, ovate-lanceolate or elliptical, tapering to each end, petioled. Flowers very showy, in terminal, many-flowered, umbel-like corymbs, varying from deep rose-color to nearly white; they appear in May and June.

Habitat.—Canada to Florida and westward; in the Northern States a low shrub, farther south it is larger, and often forms very dense thickets.

Part Used.—The leaves—not official.

Constituents.—Analysis, as yet, has thrown little light upon the supposed properties of this plant. Besides the ordinary principle of plants, there have been found in it an acrid principle, and *arbutin*, the latter one of the constituents of uva-ursi, and other ericaceous plants.

Preparations.—Kalmia imparts its virtues to boiling water and alcohol; it may be administered in decoction or tincture.

Medical Properties and Uses.—The leaves of the plant as also those of Kalmia angustifolia (*Sheep-Laurel, Lamb-kill*) are said to be poisonous to sheep and calves; and cases are reported of men being poisoned by eating the flesh of partridges which had fed upon the buds and berries. On the other hand, Wilson, the ornithologist, ate freely of the flesh of such birds without any ill effect whatever; and deer feed upon the leaves in winter, not only without ill effect upon themselves, but also without rendering their flesh unwholesome to man. And yet the common opinion is that the leaves are very poisonous. The writer himself was cautioned by an old Massachusetts farmer against meddling with *K. angustifolia* because of its poisonous nature; disregarding the advice, he ate several leaves in the presence of the farmer, without, however, convincing the latter, notwithstanding no ill effects were experienced. That persons have been poisoned seriously by eating the flesh of partridges in winter cannot be denied; that these birds may have fed upon kalmia buds and berries is also probable, but that their flesh is thus rendered poisonous does not seem as yet fully established. Some experimenters have reported effects produced in their own persons by strong decoctions of the leaves, similar to those of partridge poisoning; others quite as worthy of credence have failed to observe any sensible effect from them. Taking these contradictory statements in connection with the negative results of the chemical analyses thus far made, one may reasonably conclude either that the poisonous character of these plants has been greatly exaggerated, or that the energy of the poison, whatever it may be, is greatly influenced by the personal idiosyncrasy of the individual experimented with.

Regarding the therapeutic application of kalmia, there exists the same confusion. It is said to be "antisyphilitic, sedative to the heart, and somewhat astringent." How truly antisyphilitic it is may be conjectured from the following case reported by King: "Some time since I treated a case of syphilis of five weeks' standing, which had not received any kind of treatment during that period. The patient, at the time I first saw him, had several chancres, the surface of the body and head was covered with small red pimples, elevated above a jaundiced skin, and he was in a very debilitated condition. I administered a saturated tincture of the leaves of kalmia, and touched the chancres with a tincture of muriate of iron, and effected a cure in four weeks, removing the jaundice at the same time."

The bruised leaves, and a decoction have been used topically in some skin diseases with asserted benefit.

It would seem from the foregoing that there is much uncertainty in what has been written of kalmia, from the time of Kalm to the present day, and that the plant requires further investigation.

LEDUM.—LABRADOR TEA.

Ledum latifolium Aiton.—*Labrador Tea.*

Description.—Calyx 5-toothed, very small. Corolla: petals 5, obovate, spreading, distinct. Stamens 5, occasionally 6 or 7; anthers opening by terminal pores. Pod oblong, 5-celled, many-seeded, splitting from below upward.

A shrub 2 to 5 feet high. Leaves alternate, elliptical or oblong, entire, the margins revolute, rusty-woolly beneath, coriaceous, persistent. Flowers white, small, in terminal umbel-like clusters, from large scaly buds, appearing in June.

Habitat.—In cold bogs and mountain woods from Pennsylvania to Wisconsin and northward.

Ledum palustre Linné.—*Marsh Tea.*

Description.—Like the preceding, but with uniformly 10 stamens, oval pods, and linear leaves.

Habitat.—In swamps and wet places in British North America, and also in northern Europe and Asia.

Parts Used.—The leaves of both species—not official.

Constituents.—The leaves of marsh tea have a balsamic odor, and an aromatic, camphoraceous, bitter taste; they contain a peculiar tannin, termed *leditannic acid,* and a pungent aromatic volatile oil, besides common constituents of plants. The constituents of Labrador tea are supposed to be similar.

Preparations.—Commonly used in decoction.

Medical Properties and Uses.—Marsh tea is said to be acro-narcotic, producing, in large doses, headache, restlessness, dilatation of the pupil, and a sort of intoxication, accompanied with increased secretion of urine, saliva, and perspiration. Its sphere of therapeutic application is not definitely settled, though it has been used in spasmodic croup, whooping-cough, gout, rheumatism, and various skin diseases. A strong decoction is used externally to destroy cutaneous parasites in domestic animals, and the fresh leaves are placed in woollen cloths to protect them against moths.

Labrador tea appears to be less active than the other species, but otherwise not different from it. It is said to have been used during the Revolution as a substitute for tea.

CHIMAPHILA.—PIPSISSEWA.

Chimaphila umbellata Nuttall.—*Prince's Pine, Pipsissewa.*

Description.—Calyx 5-parted, free from the ovary, persistent. Corolla: petals 5, concave, orbicular, widely-spreading, distinct. Stamens 10; filaments enlarged and hairy in the middle; anthers more or less 2-horned at the base, which, by inversion, becomes the apparent apex. Styles very short, inversely conical, nearly immersed in the depressed summit of the globular ovary; stigma disk-shaped, the border 5-crenate. Pod depressed-globular, 5-celled, 5-valved, splitting from the apex downward.

A low, nearly herbaceous, evergreen plant, with long running underground stems, and short, ascending, leafy branches, 4 to 10 inches high. Leaves evergreen, thick and shining, cuneate-lanceolate, acute at the base, sharply serrate, whorled or scattered. Flowers white or purplish, fragrant, corymbed or umbelled on a terminal peduncle, appearing in June.

Habitat.—In dry woods; common.

Chimaphila maculata Pursh.—*Spotted Wintergreen.*

Description.—Readily distinguished from the preceding by its leaves alone, which are ovate-lanceolate, obtuse at the base, remotely toothed, and have the upper surface variegated with white.

Habitat.—Dry woods; less common than the preceding.

Part Used.—The leaves of C. umbellata—*United States Pharmacopœia.*

Constituents.—Chemical analysis, as yet, has thrown little light upon the therapeutic activity of chimaphila. Besides the common constituents of plants there have been found in it a peculiar crystalline substance, termed *chimaphilin*, which, however, does not appear to be the active principle; the latter has not been isolated.

Preparations.—Extractum chimaphilæ fluidum—fluid extract of chimaphila.—*United States Pharmacopœia.* A decoction is also efficient and sometimes preferable.

Medical Properties and Uses.—Chimaphila, in its action, closely resembles uva-ursi, and is used for like purposes. Its tonic properties are said to render it especially useful in scrofulous affections. Like uva ursi it is beneficial in chronic affections of the urinary organs. C. maculata is said to resemble it both in constituents and in therapeutic activity.

AQUIFOLIACEÆ.

Character of the Order.—Shrubs or trees with simple, mostly alternate leaves, and 4- to 8-merous flowers. Stamens as many as the lobes of the corolla, alternate with them, and inserted upon their base. Ovary free, forming, in fruit, a 4- to 8-seeded drupe; stigmas 4 to 8, or united into one, nearly sessile.

A small and comparatively unimportant order. In general, plants of this order are possessed of emetic properties.

ILEX.—HOLLY.

Character of the Genus.—Calyx 4- to 6-toothed. Corolla: petals 4 to 6, separate or united at the base. Stamens 4 to 6, alternate with the petals. Ovary 4- to 6-celled; stigmas sessile. Fruit a berry-like drupe with 4 to 6 seed-like nutlets. Shrubs or trees with simple, mostly alternate leaves. Flowers more or less diœciously polygamous.

Ilex opaca Aiton.—*American Holly.*

Description.—Parts of flower commonly in fours. Fruit red, its nutlets ribbed and veiny.

A tree 20 to 40 feet high. Leaves evergreen, oval, flat, the wavy margins with scattered spiny teeth. Flowers in loose clusters along the base of the young branches, and in the axils, appearing in June.

Habitat.—In woodlands and open places from Maine to Florida and westward; more common and of large size southward.

Ilex Cassine Walter.—*Cassena, Yaupon.*

Description.—Flowers and fruit like the preceding. A shrub 8 to 12 feet high, slender, the short spreading branches often spine-like. Leaves, evergreen, ½ to 1 inch long, oval or oblong, obtuse, crenate. Flower-clusters very numerous, sessile or nearly so, appearing in April.

Habitat.—In light sandy soil along the coast from North Carolina to Florida.

Ilex Dahoon Walter.—*Dahoon Holly.*

Description.—Flowers and fruit as in the preceding. A shrub or small tree. Leaves evergreen, 2 to 3 inches long, varying from obovate to oblong-linear, acute or obtuse, mucronate, entire, or sharply serrate above the middle, on short petioles; their under surface, as well as the younger branches and flower-clusters, pubescent. Sterile peduncles many flowered, the fertile ones shorter, mostly 1-flowered; the flowers appear in April and May.

Variety Myrtifolia (*Ilex myrtifolia* Walter) has small leaves, ½ to 1 inch long, linear-oblong, entire, or on young branches, sharply 2- to 4-toothed toward the apex.

Habitat.—Margins of swamps, North Carolina to Florida and westward.

Parts Used.—The leaves and fruit—not official.

Constituents.—The leaves of European holly (*Ilex Aquifolium* Linné) have been more carefully examined than those of any North American species. They contain a bitter principle, *ilicin*, a yellow coloring substance called *ilexanthin*, and a peculiar acid, *ilicic acid*. Some of the American species contain *caffeina*.

Preparations.—Administered in powder or infusion.

Medical Properties and Uses.—Holly has been much more used in Europe than in this country. Its bitterness led to its use in intermittent fever, but careful observation has proved it worthless in this disease. In large doses the leaves produce nausea and vomiting, while the berries, administered in like manner, cause both vomiting and purging. Possessing such irritating properties, they may, of course, be used in such manner as to cause diaphoresis, and hence probably their asserted efficacy in rheumatism. I. opaca is said to be somewhat demulcent, and has been used in pulmonary affections to allay cough and promote expectoration. I. cassine is said to be used considerably in the South as a substitute for tea; as it contains caffeina, its use in this manner is much more rational than that of several other plants which have nothing in their composition analogous to the constituents of tea.

EBENACEÆ.

Character of the Order.—Trees or shrubs with alternate entire leaves, and diœcious or polygamous, regular flowers. Calyx persistent, foliaceous. Corolla monopetalous, hypogynous. Stamens at least twice or thrice as many as the lobes of the corolla, and inserted on its tube or base. Ovary several-celled, with one or two ovules in each cell. Fruit a berry, maturing in one or more bony-coated seeds.

A small order, comprising 15 genera and 180 species, chiefly tropical. Represented in North America by the genus

DIOSPYROS.—PERSIMMON.

Diospyros Virginiana Linné.—*Persimmon, Date Plum.*

Description.—Calyx 4-lobed, increasing in size with the development of the fruit. Corolla 4-lobed, between bell-shaped and urn-shaped, greenish-yellow, thickish, glabrous. Stamens 16, in pairs, pubescent; the sterile ones of the fertile flowers 8. Ovary 8-celled; styles 4, 2-lobed at the apex. Fruit plum-like, 1 inch in diameter, 4- to 8-seeded. Yellow when ripe.

A tree 20 to 70 feet high. Leaves 2 to 5 inches long, ovate or oblong, more or less pubescent when young, at length nearly or quite smooth. Fertile flowers commonly solitary in the axils; sterile ones in threes. Fruit exceedingly astringent while green, but when ripe, after frost, very sweet and luscious.

Habitat.—In woods and old fields from Rhode Island to Iowa, and southward. East of the Alleghanies it is most common along the coast.

Part Used.—The unripe fruit. It was formerly official, but was dropped from the Pharmacopœia in 1880. The bark is also employed.

Constituents.—Tannic and malic acids, sugar and pectin.

Preparations.—Infusion and vinous tincture.

Medical Properties and Uses.—The unripe fruit and inner bark are astringent and bitter. Tannin appears to be their only constituent of therapeutic importance. Like other drugs containing tannin, persimmon has been employed in chronic and subacute catarrhal affections, and in hemorrhages, but many other articles are much more eligible and efficacious.

PLUMBAGINACEÆ.

Character of the Order.—Herbs, rarely woody, with leaves alternate or clustered at the root. Flowers regular, 5-merous. Calyx tubular, plaited, persistent. Petals united at the base, or distinct. Stamens opposite the petals or lobes of the corolla. Ovary 1-celled, free from the calyx, 1-ovuled.

An order inhabiting the sea-shore or salt marshes, mostly in temperate regions. Represented in North America by three genera, only one of which comprises medicinal species.

STATICE.—MARSH-ROSEMARY.

Statice Limonium Linné.—*Marsh-Rosemary, Sea Lavender.*

Description.—Calyx funnel-form, dry, membranaceous, persistent. Corolla: petals 5, distinct, or united below, with long claws. Stamens 5, united to the bases of the petals. Styles 5, rarely 3, distinct. Fruit membranaceous, indehiscent.

A perennial herb, with a thick, reddish, woody root. Leaves all radical, thickish, oblong, spatulate, or obovate-lanceolate, tapering into a rather long petiole. Scapes 1 to 2 feet high, loosely paniculate, the flowers in one-sided spikes on the branches, 2- to 3-bracted, appearing late in summer.

Habitat.—In salt marshes along the coast, and, in various forms, throughout the world. Our plant is *var. Caroliniana* Gray, while the form found on the Pacific coast is *var. Californica* Gray.

Part Used.—The root—not official.

Constituents.—Marsh-rosemary contains, as its most important constituent, about twelve per cent. of tannin.

Preparations.—Decoction and infusion.

Medical Properties and Uses.—Containing, as it does, a large percentage of tannin, this plant is powerfully astringent. In the early part of this century it was largely used for the same purposes as are catechu and kino now. At present its decoction is chiefly used as a domestic remedy, often as a gargle in sore throat, and as an astringent to bleeding and ulcerated surfaces.

BIGNONIACEÆ.

Character of the Order.—Trees, climbing or twining shrubs, rarely herbs, with opposite, rarely alternate, simple or compound leaves and showy, often trumpet-shaped flowers. Calyx 2-lipped, 5-cleft or entire. Corolla usually irregular, 4- to 5-lobed, deciduous. Stamens 5, unequal, one or two of them often abortive, inserted upon the corolla. Ovary free; style long; stigma 2-lipped. Fruit a 2-valved, often pod-like capsule, divided by an expansion of the placentæ. Seeds generally numerous and winged.

An order of chiefly tropical plants, comprising few medicinal species, and these possessed of no very striking properties.

BIGNONIA.

Bignonia capreolata Linné.—*Bignonia.*

Description.—Calyx somewhat bell-shaped, the margin wavy or slightly 5-toothed. Corolla irregular, bell-shaped, 5-lobed, and rather 2-lipped, orange color, two inches long. Stamens unequal, 2 long, 2 short, and 1 rudimentary and sterile. Pod 2-celled, flattened parallel with the valves and partitions. Seeds in two rows, and provided with a membranous wing.

A shrubby climber, often ascending tall trees. Wood so arranged in the stem as, in transverse section, to show a cross. Leaves of 2 oblong or ovate leaflets and a branching tendril, often with a pair of accessory leaves in the axils, resembling stipules. Flowers clustered, the peduncles 1-flowered, appearing in April.

Habitat.—In rich soil from Virginia to Southern Illinois and southward.

Part Used.—The root—not official.

Constituents.—Unknown.

Preparations.—Used in decoction.

Medical Properties and Uses.—Bignonia is said to have been used as a substitute for sarsaparilla. If it have active medicinal properties, they are yet to be ascertained.

CATALPA.

Catalpa bignonioides Walter.—*Catalpa, Indian Bean.*

Description.—Calyx 2-lipped, corolla bell-shaped, inflated, the border spreading, 4- to 5-lobed, irregular, somewhat 2-lipped, white, tinged with violet, and dotted with purple and yellow on the throat. Fertile stamens, 2 or 4; sterile and rudimentary, 1 or 3. Pod one foot long, slender, nearly cylindrical, 2-celled.

A tree twenty to fifty feet high. Leaves mostly opposite, large, cordate, pointed, pubescent, at least beneath, long-petioled. Flowers in large, showy, terminal panicles, appearing in summer.

Habitat.—Native of the Southern States, but common in cultivation in New England and New York.

Parts Used.—The bark and seeds—not official.

Constituents.—In the bark have been found tannin, an amorphous bitter principle, a bitter, nauseous crystalline body, besides common vegetable constituents.

Preparations.—A decoction.

Medical Properties and Uses.—Regarding the medicinal properties of catalpa, there is little to be said, for little of a definite character is known. It is said to be emetic and vermifuge, and to have been used in bronchitis and asthma with beneficial effect. Porcher states that the honey collected from the flowers is somewhat poisonous.

OROBANCHACEÆ.

Character of the Order.—Low, fleshy herbs, parasitic upon the roots of other plants, destitute of green foliage, bearing scales instead of leaves. Calyx 4- to 5-toothed or parted. Corolla monopetalous, tubular, 5-lobed, more or less 2-lipped, withering-persistent. Stamens 4, inserted in pairs upon the tube of the corolla. Ovary free; style long, curved at the apex; stigma large. Pod 1-celled, 2-valved. Seeds numerous.

A small order of unimportant plants. In general they possess bitter and astringent properties.

EPIPHEGUS.—BEECH-DROPS.

Epiphegus Virginiana Barton.—*Beech-Drops, Cancer-Root.*

Description.—Calyx 5-toothed. Corolla of the upper flowers long, tubular, curved, 4-toothed, whitish and purple; of the lower flowers, short, seldom expanding, but being forced from its base by the growth of the pod. Pod 2-valved at the apex, but with 2 partial partitions in each valve.

A slender much-branched herb, 6 to 12 inches high, purplish or yellowish-brown, with small scattered scales. Flowers racemose or spiked, the upper sterile, the lower fertile, appearing late in summer.

Habitat.—Parasitic upon the roots of beech-trees; very common.

Part Used.—The entire plant—not official.

Constituents.—Unknown.

Preparations.—Administered in decoction or powder.

Medical Properties and Uses.—Beech-drops has a disagreeable bitter and astringent taste, which is much more pronounced in the recent than in the dried specimen. It has been employed both topically and internally as an astringent. Doubtless its effect when applied to ill-conditioned ulcers led to the absurd notion that it is curative of cancer.

CONOPHOLIS.—CANCER-ROOT.

Conopholis Americana Wallroth—*Squaw-Root, Cancer-Root.*

Description.—Calyx irregularly 4- to 5-toothed. Corolla tubular at the base, 2-lipped, the upper lip 2-lobed, the lower 3-parted, spreading. Pod 2-valved, with 2 placentæ on each valve.

Stem 4 to 7 inches high, thick, simple, covered with ovate-lanceolate, acute scales, regularly imbricated like the scales of a pine cone : the upper scales forming bracts to the flowers. Flowers in a thick scaly spike, appearing in May and June. The entire plant is chestnut-colored or yellowish.

Habitat.—In oak woods.

Parts Used.—The entire plant—not official.

Constituents.—Unknown.

Preparations.—Used in decoction or powder.

Medical Properties and Uses.—Like those of Beech-Drops, which see.

APHYLLON.—NAKED BROOM-RAPE.

Aphyllon uniflorum Torrey and Gray.—*Naked Broom-Rape.*

Description.—Calyx 5-cleft, regular. Corolla with a long curved tube, the border 2-lipped, the upper lip deeply 2-cleft, the lower 3-cleft, purplish-white. Stamens included. Capsule 2-valved, each valve with 2 placentæ.

Stem subterranean or nearly so, scaly, often branched, each branch sending up 1 to 3 slender, 1-flowered scapes, 3 to 5 inches high. Flowers and scapes glandular-pubescent ; they appear in April and May.

Habitat.—In dry woodlands ; common.

Parts Used.—The entire plant—not official.

Constituents.—Unknown.

Preparations.—Used in decoction or powder.

Medical Properties and Uses.—Like those of Beech-Drops, which see.

SCROPHULARIACEÆ.

Character of the Order.—Herbs, rarely shrubs or trees, with opposite or alternate, exstipulate leaves, and irregular, monopetalous flowers. Calyx 5-lobed, rarely 4-lobed, persistent. Corolla 5-lobed, rarely 4-lobed, often 2-lipped or more or less irregular. Stamens 2 or 4, sometimes 5, inserted on the tube of the corolla. Ovary free, 2-celled ; style 1, undivided ; stigma entire or 2-lobed. Pod 2-celled, many-seeded.

A large and widely distributed order. Most of the species are bitter, some of them acrid, and others possess narcotic properties, so that it is difficult to characterize them in general terms.

VERBASCUM.—MULLEIN.

Verbascum Thapsus Linné.—*Common Mullein.*

Description.—Calyx 5-parted. Corolla slightly concave, wheel-shaped, 5-lobed, the lobes slightly irregular. Stamens 5, three of them with woolly filaments, the others glabrous. Style flattened at the apex. Pod globular, many-seeded.

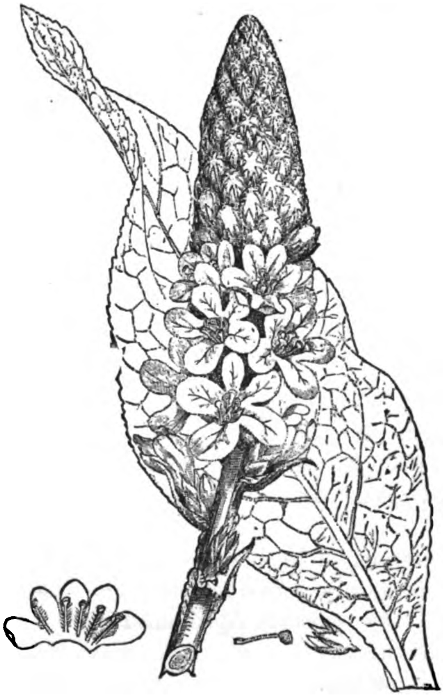


FIG. 142.—Verbascum Thapsus.

A stout, erect biennial, simple or branched above, 2 to 4 feet high, densely clothed with soft woolly hairs. Leaves oblong, pointed, slightly toothed, narrowed at the base into two wings which run down the stem; the lower ones often petiolate, and 6 to 10 inches long. Flowers yellow, in a dense, woolly, terminal spike, appearing throughout the summer.

Habitat.—Naturalized from Europe; common everywhere.

Parts Used.—The leaves and flowers—not official.

Constituents.—Both leaves and flowers contain mucilage; the flowers yield also a small amount of yellow volatile oil.

Preparations.—Of the leaves: an infusion; they are also employed in the preparation of poultices. Of the flowers: an infusion in oil is a popular preparation in some parts of Continental Europe.

Medical Properties and Uses.—The chief, if not the only medicinal constituent of mullein is its mucilage. This being admitted, the indications for the therapeutic use of the plant are plain. It may be employed in all cases requiring demulcents, and, if not as agreeable as some other agents of this class, it will probably be of equal efficacy. The infused oil of the flowers is probably no more active than oil in which flowers have not been infused; it is used as an embrocation in sprains and bruises.

SCROPHULARIA.—FIGWORT.

Scrophularia nodosa Linné.—*Figwort.*

Description.—Calyx deeply 5-parted, the lobes rounded. Corolla-tube somewhat globular, twice the length of the calyx, the margin 5-lobed, the 2 upper lobes longer than the 2 lateral, the lower spreading. Stamens 4, turned downward ; a fifth rudimentary stamen is situated at the summit of the corolla-tube. Capsule 2-celled, 2-valved, many-seeded.

A coarse, erect perennial herb, 2 to 3 feet high. Stem quadrangular. Leaves opposite, large, broadly ovate, or cordate, pointed, doubly crenate or serrate. Flowers greenish-purple, in loose cymes, forming a terminal panicle ; they appear in summer.

Habitat.—In damp woods ; common. Found also in Europe and Asia.

Parts Used.—The leaves and root—not official.

Constituents.—A peculiar principle, *scrophularin*, and the common constituents of plants.

Preparations.—Infusion and decoction.

Medical Properties and Uses.—This plant derives its generic name from its supposed efficacy in scrofula, a supposition long since proved to be without foundation. If it have any active medicinal virtue, the fact is yet to be ascertained.

CHELONE.—TURTLE-HEAD.

Chelone glabra Linné.—*Turtle-Head, Balmony.*

Description.—Calyx : sepals 5, distinct, imbricated. Corolla inflated-tubular, with the mouth but little open, 2-lipped, white ; the upper lip arched, keeled in the middle, notched at the apex ; the lower lip 3-lobed, woolly in the throat, the middle lobe smallest. Stamens, 4 perfect, woolly, and a fifth smaller, sterile. Capsule ovate, many-seeded.

A smooth perennial. Stem upright, branching. Leaves opposite, lanceolate, serrate, acuminate, narrowed at the base into a very short petiole. Flowers white, or tinged with rose-color, in sessile spikes or clusters, appearing from July till autumn.

Habitat.—In wet places ; common.

Part Used.—The herb—not official.

Constituents.—A bitter principle which has not been isolated.

Preparations.—A decoction.

Medical Properties and Uses.—Balmony is laxative or purgative, according to the dose administered. Its therapeutic limitations are, as yet, indefinite.

VERONICA.—SPEEDWELL.

Character of the Genus.—Calyx 4-parted. Corolla rotate or salverform, 4-parted, the lateral lobes or the lower one narrower than the upper. Stamens 2, one each side of the upper lobe of the corolla, exserted. Style entire. Capsule compressed, often obcordate, 2-celled, few- or many-seeded.

Herbs, rarely shrubs, with opposite or whorled leaves. Flowers solitary, axillary, or in racemes, blue, flesh-colored, or white.

Veronica Virginica Linné (*Leptandra Virginica* Nuttall).—*Culver's-Root, Culver's-Physic.*

Description.—Tube of the corolla longer than its limb, and much longer than the calyx. Both calyx and corolla sometimes 5-parted. Pod oblong-ovate, not notched, opening by 4 teeth at the summit, many-seeded.

A perennial herb. Stem simple, erect, smooth, 2 to 5 feet high. Leaves in whorls of 4 to 7, lanceolate, pointed, finely serrate. Flowers white, in dense terminal spicate panicled racemes, appearing in July and August.

Habitat—In rich, open woods, from Vermont to Wisconsin and southward.

Part Used.—The rhizome and rootlets Official name: Leptandra—*United States Pharmacopœia.*

Veronica officinalis Linné.—Common Speedwell.

Description.—Corolla with a very short tube, the limb rotate, the lower segment narrowest. Capsule obovate or obcordate, many-seeded.

A low perennial. Stem perennial at the base, much branched, creeping and rooting at the nodes. Leaves opposite, short petioled, obovate-elliptical or wedge-oblong, serrate, hairy. Flowers in axillary racemes, nearly sessile, rather small, pale blue, rarely flesh-colored, appearing in midsummer.

Habitat.—On dry hills and in open woods; common both in this country and in Europe and Asia.

Part Used.—The herb—not official.

These two species of veronica, differing very widely in habit, represent the medicinal characters of the genus. V. virginica stands, as it were, alone, all other species resembling each other to a greater or less extent.

Constituents.—Leptandra contains, in addition to the ordinary constituents of plants, a peculiar crystalline principle, *leptandrin,* having the bitter and nauseous taste of the crude drug. Speedwell also contains a bitter principle, but whether similar to, or identical with that of leptandra has not been determined.

Preparations.—Of leptandra: Extractum leptandræ—extract of leptandra; extractum leptandræ fluidum—fluid extract of leptandra.—*United States Pharmacopœia.* There is also a commercial preparation, erroneously called *leptandrin,* prepared by precipitation from the alcoholic tincture. Speedwell is commonly administered in infusion or decoction.

Medical Properties and Uses.—When fresh, leptandra acts as a violent emeto-cathartic, too violent, indeed, to be used with safety. When dried, its drastic properties are much modified, and in this condition it is said to be laxative and cholagogue. It is used in disorders of the digestive system, especially when accompanied by hepatic torpor.

Speedwell has been considered diaphoretic, diuretic, expectorant, etc., but is seldom employed, and probably possesses very little medicinal virtue.

LABIATÆ.

Character of the Order.—Herbs, rarely undershrubs, with square stems, and opposite, exstipulate leaves. Calyx tubular, 5- to 10-toothed or 2-lipped, persistent. Corolla more or less 2-lipped; the upper lip 2-lobed, or sometimes entire; the lower 3-lobed. Stamens 4, didynamous, or by abortion 2, inserted on the tube of the corolla. Ovary deeply 4-lobed; style 2-lobed at the apex. Fruit 4 seed-like nutlets or achenia, enclosed in the calyx.

Foliage commonly dotted with glands containing aromatic volatile oil. Flowers axillary, chiefly in cymose clusters, and these frequently aggregated in terminal spikes or racemes.

A very large order of aromatic plants, wholly destitute of deleterious or poisonous properties. Very many of them have been cultivated for culinary or medicinal purposes from time immemorial, hence a large percentage of the valuable species at present inhabiting North America have been introduced.

TEUCRIUM.—GERMANDER.

Teucrium Canadense Linné.—*American Germander, Wood-Sage.*

Description.—Calyx oblique, unequally 5-toothed. Corolla with the 4 upper lobes nearly equal, oblong, turned forward; the lower much larger. Stamens 4, exserted from a cleft between the two upper lobes of the corolla.

An herbaceous perennial. Stem erect, 1 to 3 feet high. Leaves ovate-lanceolate, acute, serrate, rounded at the base, petiolate; the upper ones scarcely longer than the calyx. Both stem and leaves hoary-pubescent. Flowers pale purple to white, in whorls of about 6, crowded in a long simple raceme; they appear about midsummer.

Habitat.—In low ground from Canada to Florida.

Parts Used.—The herb—not official.

Constituents.—A volatile oil, a bitter principle, and tannin.

Preparations.—Commonly employed in infusion.

Medical Properties and Uses.—Germander, both American and European species, possesses the stimulant and aromatic properties of labiate plants generally, and has been employed as a diaphoretic, diuretic, emmenagogue, etc.

MENTHA.—MINT.

Character of the Genus.—Calyx 5-toothed, regular or nearly so. Corolla bell-shaped, with a short tube, the margin nearly equally 4-lobed. Stamens 4, erect, equidistant.

Perennial herbs with flowers in dense whorls, arranged in terminal or axillary heads or spikes. Corolla pale purple or whitish.

Mentha piperita Linné.—*Peppermint.*

Description.—Smooth. Stem erect, 1 to 2 feet high. Leaves ovate-oblong, and lanceolate, serrate, petiolate. Inflorescence mostly terminal, in interrupted heads or spikes.

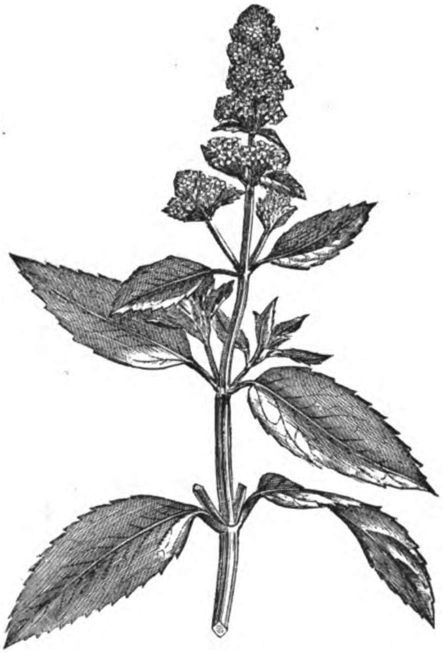


FIG. 143.—Mentha piperita.

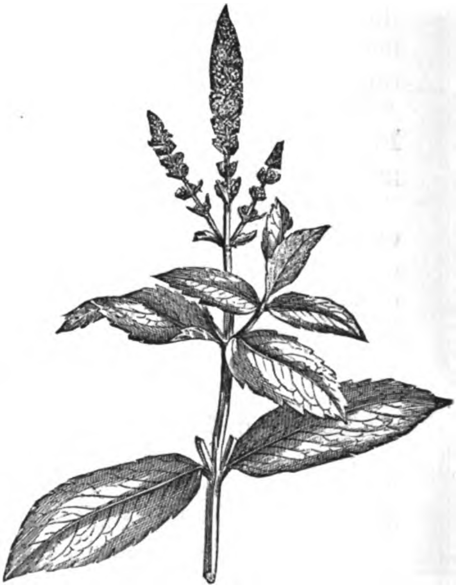


FIG. 144.—Mentha viridis.

Habitat.—Naturalized from Europe; growing in low grounds and wet places. It is extensively cultivated in some sections of the country, notably in Wayne County, New York, for the sake of its volatile oil. It multiplies rapidly by means of underground shoots.

Mentha viridis Linné.—*Spearmint.*

Description.—Nearly smooth. Stem erect, 1 to 2 feet high. Leaves oblong-lanceolate, acute, unequally serrate, nearly sessile. Inflorescence terminal, in narrow, interrupted spikes.

Habitat.—Naturalized from Europe; growing in damp soil along roadsides and in waste places.

Parts Used.—The leaves and tops of both species—*United States Pharmacopœia.*

Constituents.—The only important constituent of mint is its volatile oil.

Preparations.—Of peppermint: Aqua menthæ piperitæ—peppermint water; oleum menthæ piperitæ—oil of peppermint; spiritus menthæ piperitæ—spirit of peppermint; trochisci menthæ piperitæ—troches of peppermint. Of spearmint: Aquæ menthæ viridis—spearmint water; oleum menthæ viridis—oil of spearmint; spiritus menthæ viridis—spirit of spearmint.—*United States Pharmacopœia.* Both species are also frequently used in infusion.

Medical Properties and Uses.—The aromatic, stimulant, and carminative properties of peppermint and spearmint render them useful in a great variety of gastric and intestinal disorders characterized by colic pains. The only difference between them is one of degree, spearmint acting much more mildly than peppermint, and its flavor being to some people more agreeable.

LYCOPUS.—WATER HOREHOUND.

Character of the Genus.—Calyx 4- to 5-toothed. Corolla nearly equally 4-lobed, about the length of the calyx. Stamens 2, with rudiments of 2 more. Achenia truncate at the apex.

Perennial herbs resembling mints, but wanting their aroma, and having but 2 perfect stamens.

Lycopus Virginicus Linné.—*Bugleweed.*

Description.—Calyx-teeth 4, ovate, obtuse, without a spine, shorter than the achenia. Stem 6 to 18 inches high, obtusely 4-angled. Leaves broadly-lanceolate, serrate, tapering at both ends, short petioled. Entire plant smooth, often purplish. Flowers very small, in small capitate clusters, appearing in midsummer.

Habitat.—In wet places; common.

Lycopus Europaeus Linné.—*Water Horehound.*

Description.—Calyx-teeth 5, triangular-lanceolate, rigid and pointed, longer than the achenia. Stem 1 to 2 feet high, sharply 4-angled. Leaves oblong-lanceolate, or lance-ovate, acute, sinuate-toothed or pinnatifid, more or less petiolate. Flowers small and very numerous, in dense axillary whorls. A very variable species.

Habitat.—In wet places; common both here and in Europe.

Parts Used.—The herb of both species—not official.

Constituents.—These plants probably possess the ordinary constituents of the labiatæ, though there is evidently much less volatile oil than in many plants of the order, and more bitterness.

Preparations.—Commonly administered in infusion.

Medical Properties and Uses.—Bugleweed is said to be sedative, tonic, astringent, and narcotic, but upon what authority it is difficult to determine. Water horehound is said to be remedial in intermittent fever, but the authority for the statement is doubtful. By virtue of their bitterness, both these plants may probably produce tonic effects; and through their volatile oil they may relieve colic pains, as do the labiatæ generally, but that either of them is directly narcotic, sedative, or specific, is extremely improbable.

CUNILA.—DITTANY.

Cunila Mariana Linné.—*Dittany.*

Description.—Calyx equally 5-toothed, the throat densely hairy. Corolla twice as long as the calyx, 2-lipped; the upper lip erect, flat, emarginate; the lower 3-cleft, spreading. Stamens 2, erect, exserted, distant.

A perennial herb. Stems tufted, 1 to 2 feet high, much branched, purplish. Leaves ovate, serrate, subsessile. Flowers purplish, in corymbed cymes or clusters, appearing in midsummer.

Habitat.—In dry, open woods, from New York to Illinois and southward.

Parts Used.—The herb—not official.

Constituents.—A very fragrant volatile oil, and ordinary constituents of the labiatæ.

Preparations.—Commonly used in infusion.

Medical Properties and Uses.—Dittany acts, in every essential particular, like the mints, and is used for the same purposes.

PYCNANTHEMUM.—MOUNTAIN MINT.

Character of the Genus.—Calyx tubular 10- to 15-nerved, equally 5-toothed or with the 3 upper teeth more or less united. Corolla 2-lipped; the upper lip nearly entire; the lower trifid, the middle lobe longest, all of them ovate, obtuse. Stamens 4, distant, the lower pair longer.

Erect, rigid, perennial herbs, corymbosely branched above. Flowers numerous, in dense whorls, usually forming terminal heads or close cymes.

Pycnanthemum incanum Michaux.—*Mountain Mint.*

Description.—Calyx 2-lipped, the teeth, together with the bracts, awl-shaped, and bearded with spreading hairs.

Stem erect, 2 to 4 feet high. Leaves oblong-ovate, acute, remotely toothed, downy above and hoary-tomentose beneath, the floral ones whitened both sides. Flowers pale red, dotted with purple, in dense, flattened, compound cymes, appearing in July and August.

Habitat.—Rocky woods and barrens from New England to Michigan and southward.

Pycnanthemum linifolium Pursh.—*Virginia Thyme.*

Description.—Calyx equally 5-toothed, the teeth pointed. Corolla very short.

Stem erect, 1 to 2 feet high. Leaves narrow, sessile, entire, rigid, crowded and clustered in the axils. Flowers whitish, collected in dense, globular, often fascicled heads, crowded in terminal cymes, appearing in August.

Habitat.—Massachusetts to Illinois and southward.

Parts Used.—The herb—not official.

Constituents.—Mountain-mint has a taste intermediate between that of pennyroyal and spearmint, due to its volatile oil, its only important constituent. Virginia thyme has much less aroma, and more bitterness; it contains volatile oil, tannin, a bitter principle, etc.

Preparations.—Used in infusion.

Medical Properties and Uses.—The above-described species of pycnanthemum, together with several others of similar properties, have been used medicinally to a limited extent, for the same purposes as other labiate plants are employed. As they are less agreeable than many others of the order in common use, and are certainly no more efficient, they do not demand serious attention.

HEDEOMA.—MOCK PENNYROYAL.

Hedeoma pulegioides Persoon.—*American Pennyroyal.*

Description.—Calyx 13-nerved, gibbous at the base, 2-lipped, the throat bearded; the upper lip 3-toothed; the lower 2-cleft and spined. Corolla 2-lipped; the upper lip erect, flat, notched at the apex; the lower 3-lobed, spreading. Stamens 2 fertile and 2 rudimentary.

A low annual. Stem erect, 6 inches high, branching. Leaves oblong-ovate, obscurely serrate, petiolate. Flowers bluish, in few-flowered, axillary whorls, appearing throughout the summer.

Habitat.—In dry fields and open woods; everywhere common.

Parts Used.—The leaves and tops.—*United States Pharmacopœia.*

Constituents.—Its chief and only important constituent is an aromatic volatile oil.

Preparations.—Oleum hedeomæ—oil of hedeoma (*oil of pennyroyal*).—*United States Pharmacopœia.* It is often administered in infusion.

Medical Properties and Uses.—Pennyroyal is an aromatic stimulant, long used in flatulence, and to stimulate menstruation. In the latter case it is not to be considered as exerting, in any sense, a specific action, but simply as stimulating the secretions through its general stimulant properties, and not through any special action upon the organs engaged in the function of menstruation.

COLLINSONIA.—HORSE-BALM.

Collinsonia Canadensis Linné.—*Horse-Balm, Stone-Root.*

Description.—Calyx 2-lipped; the upper lip 3-toothed, the lower 2-cleft. Corolla greenish-yellow, somewhat 2-lipped, the throat expanded; the upper lip nearly equally 4-lobed, the lower much larger, the margin fringed. Stamens 2, rarely 4, much exserted.

A perennial herb. Stem 2 to 3 feet high, somewhat branching above. Leaves 3 to 8 inches long and 3 to 4 inches broad, ovate, serrate, acuminate, the lower on long petioles, the upper almost or quite sessile. Flowers racemose, the racemes disposed in a large panicle; they appear in summer and early autumn.

Habitat.—In rich, moist woods; common.

Parts Used.—The root and herb—not official.

Constituents.—When bruised this plant has a strong, somewhat disagreeable odor, faintly suggestive of a lemon or lime. Like other labiates its chief important constituent is a volatile oil. The constituents of the root have not been ascertained.

Preparations.—Employed in infusion and tincture.

Medical Properties and Uses.—Stone-root is said to be diuretic and tonic, and, as its name implies, useful in calculous affections. It certainly possesses stimulant properties similar to those of many other labiate plants, but whether anything beyond this is, as yet, a matter of conjecture. The leaves doubtless owe all their efficacy to their volatile oil.

MONARDA.—HORSE-MINT.

Monarda punctata Linné.—*Horse-Mint.*

Description.—Calyx tubular, elongated, somewhat curved, nearly equally 5-toothed, hairy in the throat. Corolla elongated, strongly 2-lipped, upper lip erect, linear, the lower spreading, 3-lobed, the lateral lobes ovate, obtuse, the middle one narrower. Stamens 2, inserted in the throat of the corolla, not longer than its upper lip.

A perennial herb. Stem 2 to 3 feet high, branching, whitened by a fine pubescence. Leaves lanceolate, tapering to a point, petiolate. Flowers yellowish, the upper lip spotted with purple, in a few dense whorled heads, surrounded with bracts; they appear late in summer.

Habitat.—In sandy soil from New York to Illinois and southward.

Part Used.—The herb—not official.

Constituents.—A pungent volatile oil.

Preparations.—Oleum monardæ—oil of monarda. Formerly official. It is also employed in infusion.

Medical Properties and Uses.—Horse-mint is, like other labiates, stimulating and aromatic. Like them also it is employed to relieve colic pains, and in hot infusion to induce diaphoresis, and to stimulate the menstrual function.

NEPETA.—CATMINT.

Character of the Genus.—Calyx tubular, 15-nerved, obliquely 5-toothed, the upper teeth usually longest. Corolla dilated in the throat, 2-lipped; the upper lip erect, slightly concave, notched or 2-lobed, the lower spreading, 3-lobed. Stamens 4, in pairs under the upper lip, the upper pair longer.

Nepeta Cataria Linné.—*Catnip, Catmint.*

Description.—A perennial herb 1 to 2 feet high. Leaves ovate-cordate, acuminate, coarsely serrate, petiolate, whitish downy underneath. Flowers whitish, dotted with purple, in compact cymes, forming short, oblong spikes at the ends of the branches; they appear in summer and autumn.

Habitat.—In waste places about dwellings; naturalized from Europe.

Nepeta Glechoma Bentham.—*Ground Ivy, Gill-over-the-ground.*

Description.—A more or less hairy perennial herb, creeping and rooting at the base. Leaves orbicular or reniform, crenate, petiolate, green both sides. Flowers blue, in axillary whorls of about 6, appearing early in spring and summer.

Habitat.—In waste places about dwellings; naturalized from Europe.

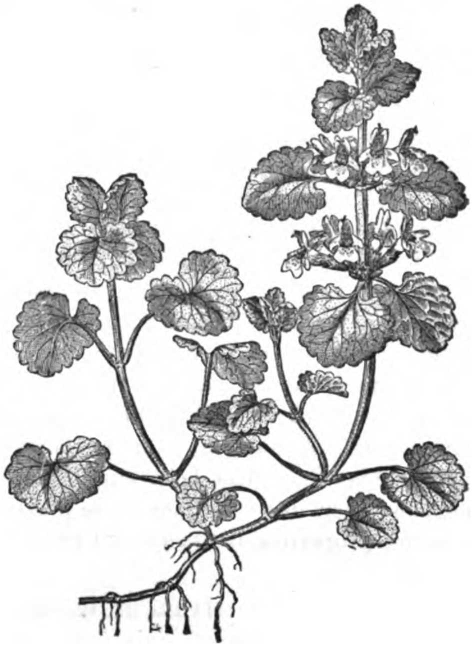


FIG. 145.—Nepeta Glechoma.

Part Used.—The herb of both species—not official.

Constituents.—Their only important constituents are their volatile oils.

Medical Properties and Uses.—Catnip is chiefly used for its stimulant effect in the flatulent colic of infants, and, in hot infusion, to promote menstruation. Ground ivy formerly had some reputation in catarrhal affections and in pulmonary consumption, but without substantial foundation, for there is no evidence to support the idea that it possesses properties essentially different from those of the labiatæ generally.

SCUTELLARIA.—SKULLCAP.

Scutellaria lateriflora Linné.—*Skullcap.*

Description.—Calyx bell-shaped, 2-lipped, the lips entire, the upper one with a helmet-like appendage on the back, and closed after flowering. Corolla 2-lipped, the upper lip vaulted, the lower dilated, spreading, convex, notched at the apex. Stamens 4, ascending under the upper lip.

A perennial herb. Stem erect, much branched, nearly smooth, 1 to 2 feet high. Leaves ovate-lanceolate, acuminate, serrate, petiolate. Flowers small, blue, in axillary and terminal, one-sided racemes, appearing late in summer.

Habitat.—In wet, shady places; common.

Part Used.—The herb—*United States Pharmacopœia.*

Constituents.—Skullcap has less volatile oil and more bitterness than most other labiate plants, but possesses no constituents essentially different from them.

Preparations.—Extractum scutellariæ fluidum—fluid extract of scutellaria.—*United States Pharmacopœia.* Commonly used in infusion.

Medical Properties and Uses.—This and several unofficial species of skullcap have at various times been esteemed of medicinal value, but on what would appear to be doubtful testimony. They are almost or quite destitute of aromatic properties, so common in labiates, and hence, one would suppose, less efficient than many other plants of the order whose medicinal virtues reside in their essential oils. Again, the diseases in which scutellaria has been found most efficient, namely, hysteria and hydrophobia, add not a little to one's scepticism. Hysteria we know is quite as often amenable to moral treatment as to drugs; and much of the hydrophobia which has been cured has been undoubtedly of a purely imaginary character. If, then, these plants do really possess any valuable medicinal properties, the fact is yet to be demonstrated.

MARRUBIUM.—HOREHOUND.

Marrubium vulgare Linné.—*Horehound.*

Description.—Calyx tubular, 5- to 10-nerved, 5- to 10-toothed, the teeth spiny, the alternate ones shorter. Corolla 2-lipped; upper lip erect, flattish or concave, notched; the lower spreading, 3-lobed, the middle lobe broadest. Stamens 4, included in the tube of the corolla.

A perennial herb. Stem ascending, hoary-pubescent, branching at the base, 1 to 2 feet high. Leaves roundish ovate, crenate, petiolate. Flowers white, in capitate whorls, appearing late in summer.

Habitat.—In waste places; naturalized from Europe.

Parts Used.—The leaves and tops—*United States Pharmacopœia.*

Constituents.—Volatile oil, a peculiar bitter principle, *marrubiin*, and common vegetable principles.

Preparations.—Commonly administered in infusion, or syrup.

Medical Properties and Uses.—Horehound is stimulant, tonic, and slightly laxative. In warm infusion it produces diaphoresis, and is often used in this manner in the early stages of colds; while its tonic influence, when taken cold, has been found serviceable in chronic pulmonary diseases.

LEONURUS.—MOTHERWORT.

Leonurus Cardiaca Linné.—*Motherwort.*

Description.—Calyx 5-nerved, 5-toothed, the teeth when old stiff and prickly. Corolla 2-lipped; the upper lip erect, concave, entire; the lower 3-lobed, spreading. Stamens 4, ascending under the upper lip of the corolla.

A perennial herb. Stem erect, slightly hairy, 2 to 4 feet high. Leaves long-petioled; the lower rounded, palmately lobed; the upper cuneate at the base, 3-cleft, the lobes lanceolate. Flowers pale purple, in close axillary whorls, appearing in summer.

Part Used.—The herb—not official.

Constituents.—Volatile oil, a bitter principle, and common vegetable constituents.

Preparations.—Commonly administered in infusion.

Medical Properties and Uses.—Motherwort is stimulant and slightly tonic. In warm infusion it is occasionally used to promote diaphoresis.

CONVOLVULACEÆ.

Character of the Order.—Chiefly twining or trailing herbs, rarely shrubby, with alternate leaves or scales. Calyx of 5 imbricated sepals. Corolla monopetalous, 5-plaited or 5-lobed, convolute in the bud. Stamens 5, inserted in the tube of the corolla. Ovary free, 2-, rarely 3-celled or sometimes 4-celled by a false partition. Fruit a 2- to 6-seeded capsule.

A large order of mostly tropical plants, many of which are cultivated for ornament, and several, as jalap and scammony, possess important medicinal properties.

IPOMŒA.

Ipomœa pandurata Meyer—*Wild Potato-Vine, Man-of-the-Earth.*

Description.—Calyx: sepals ovate-oblong, obtuse, smooth. Corolla open funnel-form, 3 inches long, white, the tube tinged with purple. Stamens included. Capsule 2-celled, 4-seeded.

An herbaceous perennial with a very large thick root. Stems long and stout, trailing or twining. Leaves cordate, entire, somewhat acuminate, on long petioles. Peduncles longer than the petioles, 1- to 5-flowered. The flowers are produced during summer.

Habitat.—In sandy fields from Connecticut to Illinois and southward.

Part Used.—The root—not official.

Constituents.—The fresh root, when wounded, emits a milky, resinous juice which probably contains its active principle.

Preparations.—It has been administered in powder and in infusion.

Medical Properties and Uses.—This plant, generically allied with jalap

(*Ipomœa Jalapa*), possesses similar properties, but of a much less active character. It has been used to a limited extent only, for it is much less efficient than jalap and many other common purgatives.

SOLANACEÆ.

Character of the Order.—Herbs, rarely shrubs, with colorless juice and alternate leaves. Flowers generally regular, 5-merous, on pedicels without bracts. Calyx commonly persistent. Corolla monopetalous, valvate or convolute in the bud, often plaited. Stamens inserted in the tube of the corolla, equal in number to, and alternate with its lobes. Ovary free, 2-celled; style and stigma single. Fruit a berry or pod.

A large order of chiefly tropical plants. In general they contain narcotic principles; a few of them, as the potato, tomato, and egg-plant, afford important articles of food. Very few of the strictly North American species deserve mention; those described below, though mostly introduced, are so widely diffused, and most of them so important, that they may well be considered, for our purposes, as indigenous.

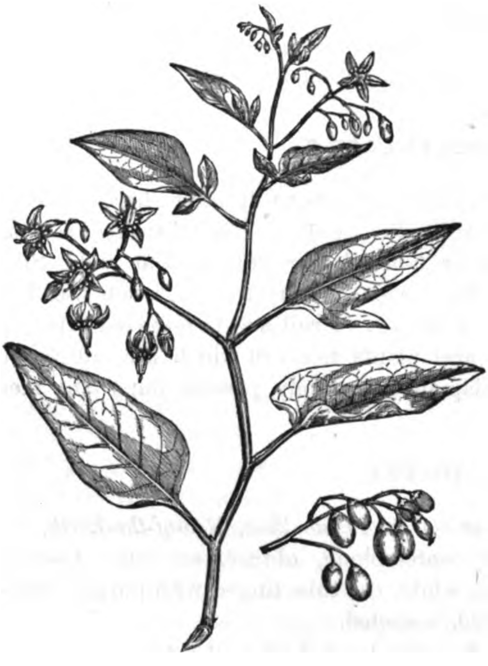


FIG. 146.—Solanum Dulcamara.

SOLANUM.—NIGHTSHADE.

Solanum Dulcamara Linné.—*Bittersweet.*

Description.—Calyx persistent, 5-lobed, the lobes obtuse, purple. Corolla rotate, 5-lobed, the lobes acute, reflexed, purple, with two green spots at the base; the tube very short. Stamens 5, short, black; anthers yellow. Berry small, ovoid or globular, red, several-seeded.

A somewhat shrubby perennial. Stems flexuous, trailing or climbing, often several feet in length. Leaves petiolate, ovate or ovate-lanceolate, 2 to 3 inches long, the lower entire, the upper often with a small lobe or segment on each side, glabrous or downy. Flowers rather small, in loose cymes on lateral peduncles shorter than the leaves, appearing in midsummer; they have a heavy narcotic odor.

Habitat.—In moist situations; common. Introduced from Europe.

Parts Used.—The young branches—*United States Pharmacopœia.*

Constituents.—As its common name indicates, this plant has a taste which is first bitter, then sweet. Its only important constituent thus far discovered is a peculiar principle termed *dulcamarin;* this has, to an intense degree, the taste of the plant.

Preparations.—Extractum dulcamaræ fluidum—fluid extract of dulcamara.—*United States Pharmacopœia.* The plant is frequently administered in decoction.

Medical Properties and Uses.—Bittersweet, in full doses, produces a certain amount of cerebral disturbance of a narcotic character, together with dryness of the throat, and sometimes an erythematous eruption of the skin, with a tendency to diaphoresis. It has been employed with benefit in a variety of cutaneous eruptions, in muscular rheumatism, and in chronic bronchial and pulmonary affections.

This plant should be carefully distinguished from *Woody Bittersweet* (*Celastrus scandens*), which see.

Another species of this genus, *S. nigrum* Linné (*Black Nightshade*), also introduced, and very common in waste places around dwellings, is said to possess similar properties.

PHYSALIS.—GROUND CHERRY.

Character of the Genus.—Calyx 5-cleft, persistent, enlarging after flowering, and at length enclosing the berry. Corolla wheel-shaped or bell-shaped, with a very short tube, the margin 5-lobed. Stamens 5, enclosed in the tube of the corolla. Fruit a succulent, 2-celled berry. Annual or perennial herbs.

Physalis Alkekengi Linné.—*Strawberry Tomato, Winter Cherry.*

Description.—Calyx-teeth awl-shaped; fruiting calyx much inflated, membranaceous, turning red at maturity. Corolla-tube very short, covering the stamens. Berry globular, bright red, edible.

A perennial herb. Stem 1 to 1½ foot high, sparingly branched, more or less pubescent. Leaves large, broadly ovate, pointed, somewhat narrowed at the base. Flowers solitary, axillary, greenish-white, appearing late in summer.

Habitat.—Introduced from Europe; cultivated, and naturalized in waste places.

Physalis Pennsylvanica Linné.

Description.—Calyx-lobes variable; fruiting calyx conical or globular-ovate, pointed, with an impressed base. Corolla 5-angled or barely 5- to 10-toothed; the tube marked with five concave spots. Berry red.

A perennial herb. Stem 1 foot high, erect or diffuse, minutely pubescent or nearly glabrous. Leaves ovate, oblong, or oblong-lanceolate and tapering at the base, entire or sparingly repand-toothed. Flowers solitary, axillary, greenish-yellow, darker in the centre, appearing late in summer.

Habitat.—In dry or sandy soil, from Pennsylvania to Florida and westward.

Parts Used.—The herb and fruit of C. Alkekengi—not official.

Constituents.—The herb contains a peculiar bitter principle termed *physalin;* the berries sugar and citric acid.

Preparations.—The herb has been employed in powder, decoction, and vinous tincture; the fruit, fresh, or dried and powdered.

Medical Properties and Uses.—Physalis appears to be entirely destitute of acrid and narcotic properties, so common in the solanaceæ. Alkekengi, by virtue of its bitter principle, appears to be tonic and febrifuge. It has been employed in Europe in intermittents with satisfactory results. The berries are pleasant to the taste, and are cultivated for the same purposes as other small fruits of the garden. They have been employed medicinally in urinary diseases, and in gout, but, considering their constituents, one would not naturally expect them to be very active.

The indigenous species above described probably possesses similar properties. Several other North American species might also be included in the same statement.

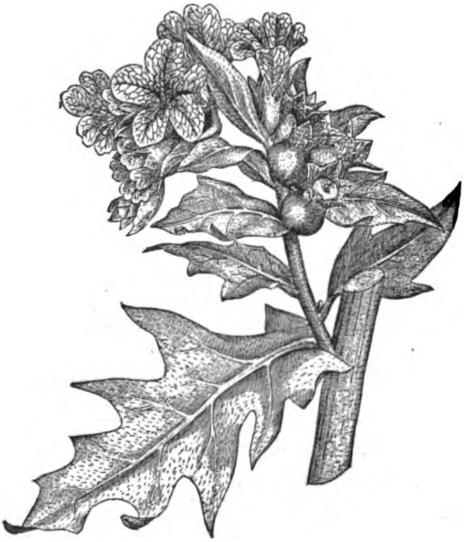


FIG. 147.—Hyoscyamus niger.

HYOSCYAMUS.—HENBANE.

Hyoscyamus niger Linné.—*Henbane.*

Description. — Calyx bell-shaped or urn-shaped, 5-lobed, persistent, the lobes broad, stiff, almost prickly. Corolla funnel-form, about 1 inch long, the border 5-lobed, and more or less plaited. Stamens declined. Capsule globular, enclosed in the persistent and enlarged calyx, 2-celled, many-seeded, opening by a lid at the top.

An annual or biennial herb, erect, 1 to 2 feet high, more or less hairy and viscid, with a fetid, nauseous smell. Leaves rather large, sessile; the upper ones clasping, ovate, irregularly pinnatifid. Flowers sessile, in one-sided leafy spikes; corolla pale dingy-yellow, with purplish vines.

Habitat.—Introduced from Europe; naturalized in waste places.

Parts Used.—The leaves collected from plants of the second years' growth—*United States Pharmacopœia.* The seeds are also employed, and were formerly official.

Constituents.—The only really important constituent of henbane appears to be the alkaloid *hyoscyamia.*

Preparations.—Abstractum hyoscyami—abstract of hyoscyamus; extractum hyoscyami alcoholicum—alcoholic extract of hyoscyamus; extractum hyoscyami fluidum—fluid extract of hyoscyamus; tinctura hyoscyami—tincture of hyoscyamus; hyoscyaminæ sulphas—sulphate of hyoscyamine.—*United States Pharmacopœia.*

Medical Properties and Uses.—Hyoscyamus is anodyne and hypnotic, and is used in a great variety of cases requiring a soothing effect upon the nervous system. In general terms, it may be said to have been employed formerly in nearly the same class of cases in which chloral and the bromides are at present so largely used. As an anodyne it is much less powerful than opium, but has the advantage of being laxative rather than constipating, and of producing no unpleasant after-effects. As a hypnotic it is less efficient than chloral, but also less dangerous, and much less likely to lead to the pernicious habit of taking sleeping potions.

Much of the uncertainty attributed to hyoscyamus is doubtless due to inefficient preparations, made from old and inert specimens of the drug. Even hyoscyamia, the active principle, is rather unstable and unreliable. Hence it is desirable that preparations should be made from the recent herb if possible.

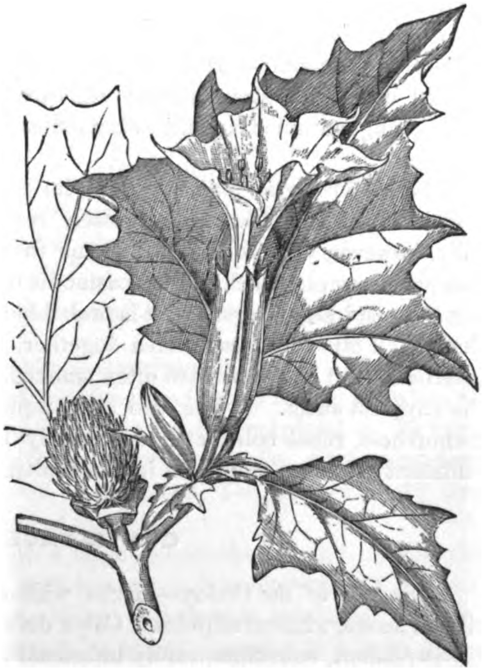


FIG. 148.—Datura Stramonium.

DATURA.

Datura Stramonium Linné.—*Stramonium, Thorn-Apple, Jamestown Weed.*

Description.—Calyx tubular, 5-toothed, the upper part falling off after flowering, while a small portion remains as a circular rim about the base of the capsule. Corolla funnel-form, spreading, plaited, about 3 inches long, white, the margin 5-toothed. Fruit a globular, very prickly capsule, 4-valved, 2-celled, each cell incompletely divided into 2 others by a false partition extending nearly to the top. Seeds very numerous, rather large, flat.

A coarse glabrous annual. Stem erect, 1 to 3 feet high, with spreading, forked branches, green. Leaves rather large, ovate, with irregular, angular, or pointed teeth or lobes. Flowers solitary, on short peduncles, in the forks or at the ends of the branches; they have a sickening odor.

A plant differing from this only in being rather more robust, and in having a purplish stem and pale violet-purple flowers, is recognized by some authors as a distinct species under the name *Datura Tatula* Linné.

Habitat.—Common in waste places. D. Stramonium is a native of Asia; D. Tatula is rather doubtfully attributed to tropical America.

Parts Used.—The leaves and seeds of D. Stramonium—*United States Pharmacopœia.* D. Tatula is just as efficient.

Constituents.—The most important constituent of stramonium is the alkaloid *daturia,* which is found in all parts of the plant. Daturia produces effects similar to those of atropia, and is said by some chemists to be a mixture of atropia and hyoscyamia.

Preparations.—Of the leaves—no official preparations. Of the seeds: extractum stramonii—extract of stramonium; extractum stramonii fluidum—fluid extract of stramonium; tinctura stramonii—tincture of stramonium; unguentum stramonii—stramonium ointment.—*United States Pharmacopœia.*

Medical Properties and Uses.—In its effects upon the human system in a state of health, stramonium closely resembles belladonna; therapeutically, however, each of the two seems to have a sphere of its own. Stramonium is employed chiefly in spasmodic diseases, particularly those affecting the respiratory organs. It is probably more used in spasmodic asthma than in all other diseases taken together. Here it is not only employed internally, but the leaves are often smoked, the smoke being inhaled, with the happiest effect. It has also some reputation in whooping-cough, dysmenorrhœa, renal colic, etc. Externally the freshly bruised leaves and ointment are often employed in rheumatism and other painful affections.

GENTIANACEÆ.

Character of the Order.—Herbs with opposite, entire, simple, usually ribbed leaves, without stipules. Calyx divided, persistent. Corolla withering-persistent, convolute, rarely imbricate or valvate in the bud. Stamens of the same number as the lobes of the corolla, alternate with them, and inserted on its tube. Ovary 1-celled, with 2 parietal placentæ, or with nearly the whole inner face of the ovary bearing ovules; style 1; stigmas 2. Fruit commonly a 2-celled, many-seeded pod.

A large order of plants, generally possessing bitter tonic properties.

SABBATIA.—American Centaury.

Sabbatia angularis Pursh.—*American Centaury.*

Description.—Calyx deeply 5-parted. Corolla deeply 5-parted, the oval lobes twice the length of the calyx. Stamens 5, inserted on the short corolla-tube; anthers oblong, soon recurved. Style longer than the stamens, declined; stigmas 2. Capsule 1-celled, 2-valved.

A smooth biennial. Stem erect, 1 to 2 feet high, square, the angles winged; branches axillary, opposite. Leaves ovate, entire, somewhat cordate and clasping at the base. Flowers numerous, large and showy, rose-pink, forming a large corymb; they appear late in summer.

Habitat.—In rich dry soil from New York to Illinois and southward.

Part Used.—The herb—not official.

Constituents.—This, and probably all other species of sabbatia, contains a bitter principle which has not, as yet, been isolated, to which their medicinal virtue is due.

Preparations.—Commonly administered in infusion.

Medical Properties and Uses.—American centaury is a simple bitter tonic. It was, in early days, used in intermittent and remittent fevers, and probably, like other agents of the same class, sometimes with curative effect. At present it is seldom employed, though it might doubtless be occasionally beneficial as a promoter of the appetite, and an aid to digestion in cases of debility and in convalescence. Several other indigenous species are said to possess similar or identical properties.

FRASERA.—American Columbo.

Frasera Carolinensis Walter.—*American Columbo.*

Description.—Calyx 4-parted, persistent. Corolla rotate, 4-parted, the lobes oblong, mucronate, each with a depressed fringed gland on the upper face. Stamens 4, alternate with the lobes of the corolla. Style persistent; stigmas spreading. Capsule oval, compressed, 1-celled, 2-valved; seeds few, large, borne on the margins of the valves.

A smooth perennial herb, with a large spindle-shaped root. Stem cylindrical, erect, 3 to 8 feet high, with leaves and branches mostly in whorls of four. Leaves sessile, lance-oblong, the lowest spatulate. Flowers greenish-yellow, dotted with purple, in cymes disposed in a large pyramidal panicle, appearing in midsummer.

Habitat.—In rich dry soil, from Southern New York to Georgia and westward.

Part Used.—The root—formerly official, but dropped from the Pharmacopœia in 1880.

Constituents.—*Gentisic acid,* and *gentiopicrin,* both of which are found also in gentian, the latter being a bitter principle, and apparently the most important medicinal constituent of the plants.

Preparations.—Commonly administered in infusion.

Medical Properties and Uses.—In the recent state, American columbo is said to be emetic and cathartic, but when dried it appears to possess only bitter tonic properties similar to those of gentian. In the recent state, it has been employed as a substitute for rhubarb, but it is, at best, a poor one; while, as a tonic, the dried drug is much inferior to gentian or true columbo.

GENTIANA.—GENTIAN.

Character of the Genus.—Calyx 4- to 5-cleft. Corolla 4- to 5-lobed, usually with intermediate smaller segments. Stamens 4 to 5. Ovary 1-celled; style short or absent; stigmas 2, persistent. Fruit a 1-celled, 2-valved, many-seeded capsule.

Perennial herbs with opposite, ribbed leaves. Flowers solitary or cymose, commonly blue, though sometimes white, yellow, or even red, appearing late in summer or in autumn.

All gentians are more or less bitter, and all possess medicinal activity, though few indigenous species have been subjected to experiment. Those described below are selected more as common representatives of the genus as found in different sections of the country than because of their reputation as therapeutic agents.

Gentiana crinita Froel.—*Fringed Gentian.*

Description.—Calyx 4-cleft, the lobes unequal, ovate and lanceolate, as long as the tube of the corolla. Corolla funnel-form, deeply 4-parted, the lobes obovate, wedge-shaped, the summit finely and beautifully fringed. Stamens 4; filaments as long as the corolla-tube. Pod short-stalked.

Stem erect, smooth, 1 to 2 feet high. Leaves ovate-lanceolate, somewhat cordate or rounded at the base. Flowers solitary on long peduncles, terminating the stem or simple branches. Corolla 2 inches long, sky-blue, showy.

Habitat.—In low grounds from New England to Wisconsin and southward. A common and very beautiful species.

Gentiana ochroleuca Froel.—*Yellowish-white Gentian.*

Description.—Calyx 5-parted, the lobes linear, unequal, erect. Corolla bell-shaped, with plaited appendages between the lobes, one-third or one-half longer than the calyx. Anthers erect, separate.

Stem ascending ½ to 1 foot high, mostly smooth. Leaves oblong or obovate-oblong, narrowed at the base, the upper ones narrower and acute. Flowers in a dense terminal cluster, and in axillary clusters. Corolla open, 1 to 1½ inch long, greenish-white, striped with green and purple veins within.

Habitat.—In dry grounds from Southern Pennsylvania southward.

Gentiana Andrewsii Grisebach.—*Closed Gentian.*

Description.—Calyx 5-parted, the lobes ovate, recurved, shorter than the tube. Corolla inflated club-shaped, closed at the mouth, the broad, short, rounded lobes remaining in apposition and concealing the intermediate fringed appendages. Anthers connivent. Pod at length projecting from the persistent corolla.

Stem erect, smooth, simple or sparingly branched, 1 to 2 feet high. Leaves ovate-lanceolate, acute, narrowed at the base. Flowers in terminal and axillary clusters; corolla 1 to 1½ inch long, pale blue, sometimes white.

Habitat.—In rich moist situations; the most common species northward.

Gentiana puberula Michaux (*G. Catesbœi* Elliott).—*Blue Gentian.*

Description.—Calyx 5-parted, the lobes lanceolate, about as long as the tube. Corolla large, open, the lobes ovate, spreading, 2 to 4 times as long as the cut-toothed appendages. Anthers connivent.

Stem erect or ascending, 1 to 1½ foot high, rough or slightly pubescent. Leaves lanceolate or linear-lanceolate, rough-margined. Flowers in axillary and terminal clusters; corolla bright blue, lined with yellow and deeper blue.

Habitat.—Dry prairies and barrens from Ohio to Wisconsin and southward.

Part Used.—The root—not official. That of the last described species was formerly official, but was dropped from the Pharmacopœia in 1880.

Constituents.—Nothing of a positive nature is known of the chemical constituents of these plants, though they are supposed to be identical with those of the official species, *G. lutea.*

Preparations.—Water extracts the bitter principle of these plants, hence they may be employed in infusion or decoction.

Medical Properties and Uses.—There is probably no other difference than of degree between the therapeutic effect of these and the official species, and they may be employed for like purposes.

MENYANTHES.

Menyanthes trifoliata Linné.—*Buckbean, Marsh Trefoil.*

Description.—Calyx 5-parted, the lobes obtuse. Corolla rotate or short funnel-form, more than twice as long as the calyx, 5-parted, deciduous, the upper surface white bearded, the lobes valvate in the bud with the margins turned inward. Stamens 5, as long as the corolla. Style slender, persistent; stigma 2-lobed. Capsule 1-celled, many-seeded, bursting irregularly.

An herbaceous perennial with a long, round, jointed, horizonital rhizome, with numerous fibrous rootlets. Leaves trifoliate, upon long sheathing petioles, which proceed from the end of the rhizome; leaflets oval or oblong, entire or bluntly denticulate, smooth. Flowers racemose on a naked scape 1 foot high, white or reddish, appearing in May or June.

Habitat.—In bogs from New England to Pennsylvania, Wisconsin, and northward.

Parts Used.—The rhizome and leaves—not official.

Constituents.—A bitter principle, termed *menyanthin*, appears to be the only active constituent.

Preparations.—Infusion, decoction, and alcoholic tincture.

Medical Properties and Uses.—Buckbean possesses the bitter tonic properties common to the gentianaceæ, and also has some cathartic power, hence it may be used in cases requiring a tonic and laxative effect.

LOGANIACEÆ.

Character of the Order.—Herbs, shrubs, or trees, with opposite, entire, stipulate leaves. Calyx 4- to 5-parted. Corolla 4- to 5-cleft or parted, convolute, valvate, or imbricate in the bud. Stamens 4 to 5, not always of the same number as the lobes of the corolla. Ovary free from calyx. Fruit a capsule or berry.

An order of plants inhabiting the tropics chiefly, generally possessing active poisonous properties. Strychnos, Gelsemium and Spigelia are well-known examples.

GELSEMIUM.—Yellow Jessamine.

Gelsemium sempervirens Aiton.—*Yellow Jessamine.*

Description.—Calyx small, 5-parted, the lobes lanceolate, acute. Corolla funnel-form, ¾ to 1½ inch long, the margin 5-lobed, the lobes imbricated in the bud. Stamens 5, half as long as the corolla, upon which they are inserted; anthers oblong, sagittate. Style longer than the stamens; stigmas 2, each 2-parted. Pod elliptical, flattened contrary to the partition, 2-celled, 2-valved, many-seeded.

A smooth, twining, shrubby perennial. Leaves opposite, entire, ovate or lanceolate, petiolate, smooth and shining, nearly evergreen. Flowers showy and fragrant, in short axillary clusters; pedicels with scaly bracts. The flowers appear in March and April.

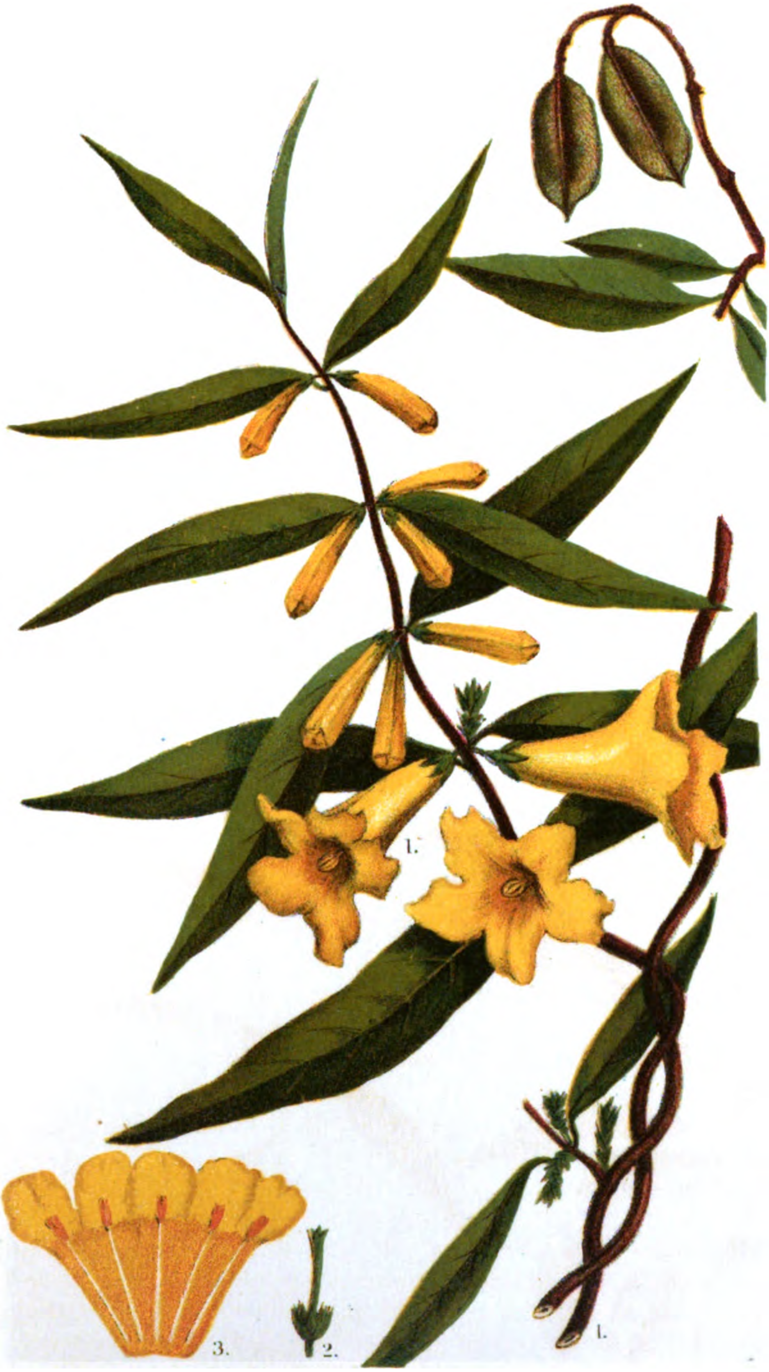
Habitat.—In low grounds from Virginia to Florida; often cultivated for ornament.

Parts Used.—The rhizome and rootlets—*United States Pharmacopœia.*

Constituents.—In addition to common vegetable principles, there exist in gelsemium a peculiar alkaloid, *gelseminia* and *gelseminic acid*, the latter being identical with *æsculin*, a principle found in the horse-chestnut.

Preparations.—Extractum gelsemii fluidum—fluid extract of gelsemium; tinctura gelsemii—tincture of gelsemium.—*United States Pharmacopœia.*

PLATE VII.



L. Johnson. Del.

GELSEMIUM SEMṔERVIRENS.

H. BENCKE [illegible] N. Y.

PLATE VII.—Gelsemium sempervirens.

FIG. 1.—A flowering branch.

FIG. 2.—Calyx and pistil.

FIG. 3.—Corolla with stamens—all natural size.

Medical Properties and Uses.—Gelsemium is a very powerful drug whose therapeutic limitations are not, as yet, accurately defined. In toxic doses—and, unfortunately, these have been only too frequently administered—it produces paralysis of both motion and sensation, without, however, greatly affecting the mind, except in rare instances. In fatal cases, after motion is entirely destroyed, the respiration becomes progressively more and more labored, and finally ceases from paralysis of the respiratory muscles. Occasionally death is preceded by convulsions and coma, but usually the mind is clear nearly to the last. These severe effects of the drug, moreover, have not always borne a definite relation to the size of the dose administered. In other words, there seems to be an amount of uncertainty about the action of the drug which, on the one hand, adds to its danger, and on the other, detracts from its value as a therapeutic agent. In some cases, quite unexpectedly, poisonous effects have followed doses supposed to be far within the limits of safety; in others, much larger doses have failed to produce the therapeutic effects desired and expected. Regarding its therapeutic applications, rejecting, as we reasonably may, all its claims to specific effect in certain diseases, there seems to remain no other just place for it except in febrile and inflammatory affections of a decided sthenic type. That in such cases it may moderate or subdue febrile action, through its powerfully depressant effects, is very evident; but that the desired results can be obtained more readily and more safely by this drug than by several other better-known and more certain agents, certainly requires demonstration. Meanwhile the judicious physician will suspend judgment, or, at least, experiment with great caution.

SPIGELIA.—PINKROOT.

Spigelia Marilandica Linné.—*Pinkroot.*

Description.—Calyx deeply 5-parted, the lobes very slender, pointed, persistent. Corolla five times as long as the calyx, tubular funnel-form, somewhat inflated toward the summit, the border with 5 acute, spreading segments. Stamens 5, very short, inserted in the mouth of the corolla and alternate with the segments. Ovary small, ovate, free; style longer than the corolla, slender, jointed near the middle, hairy above. Capsule double, consisting of 2, cohering, 1-celled, few-seeded carpels which separate at maturity, and open loculicidally.

An herbaceous perennial, with a short rhizome, beset with numerous fibrous rootlets. Stems several from the same rhizome, erect, ½ to 1½ foot high, simple. Leaves opposite, sessile, ovate, acuminate, entire, smooth, with the margins and veins somewhat pubescent. Flowers spiked, in one-sided cymes; the spikes simple or forked, short, appearing in June and July. The corolla is 1½ inch long, scarlet or crimson without, yellow within, and very showy.

Habitat.—In rich woods from Pennsylvania to Wisconsin and southward.

Parts Used.—The rhizome and rootlets—*United States Pharmacopœia.*

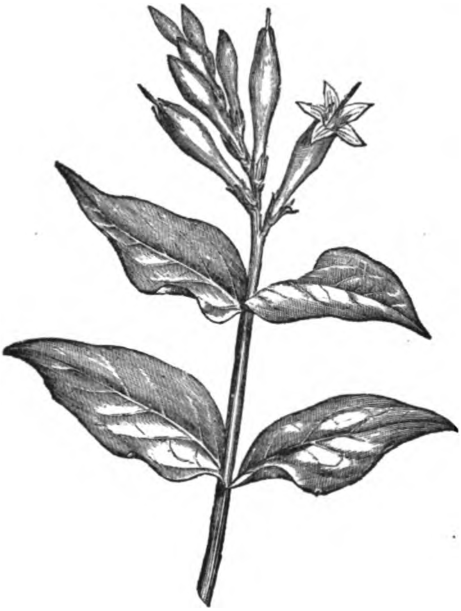


FIG. 149.—Spigelia Marilandica.

Constituents.—A peculiar bitter principle, volatile oil, resin, tannin and other common vegetable principles. Upon which of its chemical constituents its therapeutic virtues depend is not known.

Preparations. — Extractum spigeliæ fluidum—fluid extract of spigelia.—*United States Pharmacopœia.* It is most commonly administered in infusion or decoction.

Medical Properties and Uses.—Spigelia enjoys a high reputation among the laity as a remedy for lumbricoid worms, but, as it is commonly administered with senna, there is a difference of opinion as to which of the drugs is the more active agent in the destruction of the worms. However this may be, spigelia is certainly entitled to a share of the credit. It is even capable of producing toxic effects upon the human subject, such as drowsiness, muscular tremor, strabismus, and convulsions, hence the practice of administering it in large and often-repeated doses to young children, upon the bare suspicion of the presence of worms, cannot be too strongly condemned.

APOCYNACEÆ.

Character of the Order.—Plants with opposite, rarely alternate, exstipulate leaves, and generally an acrid, milky juice. Calyx 5-parted. Corolla 5-parted, the lobes convolute in the bud. Stamens 5, inserted on the corolla ; filaments distinct. Ovaries 2, distinct, but with styles united. Fruit a pod.

A large order of chiefly tropical plants, represented in North America by only a few genera.

APOCYNUM.—DOGBANE.

Character of the Genus.—Calyx 5-parted, small, the lobes acute. Corolla 5-cleft, bearing 5 triangular scales in the throat opposite the lobes.

Stamens 5, inserted on the base of the corolla ; filaments flat, shorter than the sagittate anthers. Style none ; stigma large, slightly 2-lobed. Fruit consists of 2 long, coriaceous pods ; seeds numerous, ovoid, with a long tuft of silky down at the apex.

Perennial herbs with upright, branching stems, opposite, mucronate-pointed leaves, tough fibrous bark, and small, pale, terminal or axillary flowers, on short pedicels.

Apocynum androsæmifolium Linné.—*Dogbane.*

Description.—Stem 2 to 3 feet high, smooth, often purplish, with forked branches above. Leaves ovate, petiolate, smooth or somewhat downy. Flowers in loose spreading cymes ; corolla bell-shaped, the lobes revolute, the tube longer than the ovate, pointed segments of the calyx, pale rose-color, appearing in June and July.

Habitat.—In copses, and borders of woods ; common.

Apocynum cannabinum Linné.—*Indian Hemp.*

Description.—Stem and branches erect or ascending, 2 to 3 feet high, smooth. Leaves oblong or oblong-lanceolate, obtuse or rounded, or the uppermost acute at both ends, petiolate. Flowers smaller than in the preceding, in close, many-flowered cymes ; corolla-lobes nearly erect, the tube not longer than the lanceolate segments of the calyx, greenish-white, appearing in July and August. A somewhat variable species.

Habitat.—In shady places ; common.

Part Used.—The root of A. cannabinum—*United States Pharmacopœia.* The root of the other species is also used.

Constituents.—The active principles of these plants have not been isolated.

Preparations.—They are usually employed in decoction.

Medical Properties and Uses.—A. cannabinum is diaphoretic, diuretic, emetic, and cathartic. It has been used chiefly in dropsy, and is said to possess some advantages over many hydrogogues in that it acts not only upon the bowels but powerfully also upon the skin and kidneys. The other species possesses similar properties, but is believed to be less active.

ASCLEPIADACEÆ.

Character of the Order.—Plants with opposite or whorled, rarely scattering, exstipulate leaves, and a milky juice. Calyx 5-parted. Corolla 5-parted, the lobes commonly valvate in the bud. Stamens 5, inserted in the corolla ; filaments commonly united into a tube which encloses the pistil ; anthers adherent to the stigma ; pollen cohering into granular or wax-like masses. Fruit a pod.

A large order of chiefly tropical plants, represented in North America by only a few comparatively unimportant genera.

ASCLEPIAS.—MILKWEED.

Character of the Genus.—Calyx 5-parted, persistent, the lobes small, spreading. Corolla deeply 5-parted, the lobes bent downward toward the stalk; within the petals are 5 hooded processes, each with an incurved horn, forming what is called the crown, and enclosing the stamen-tube. Stamens 5, inserted in the base of the corolla; filaments united into a tube which encloses the pistil; anthers adherent to the stigma, each with 2 vertical cells, each cell containing a flattened pear-shaped mass of pollen. Ovaries 2; styles united; stigma 1, fleshy, 5-angled. Follicles 2, one of them often abortive, ovate or somewhat curved, spindle-shaped; seeds numerous, tufted with soft silky hairs.

Perennial herbs with thick, deep-growing roots. Flowers terminal or lateral in simple, many-flowered umbels.

Asclepias cornuti Decaisne (*A. Syriaca* Linné).—*Milkweed, Silkweed.*

Description.—Hoods of the crown ovate, obtuse, with a lobe or tooth on each side of the short and stout horn. Pods ovate, woolly, and rough, with soft spines. Stem simple, erect, stout, 3 to 4 feet high. Leaves opposite, oblong-ovate, with short petioles, smooth above, minutely downy beneath, pale green. Umbels many-flowered, terminal and lateral in pedicels shorter than the leaves; flowers greenish-purple, appearing in midsummer.

Habitat.—Common everywhere.

Asclepias incarnata Linné.—*Swamp Milkweed.*

Description.—Hoods of the crown scarcely as long as the slender, pointed horn. Pods commonly smooth and glabrous. Stem erect, branching, 2 to 3 feet high, leafy to the top. Leaves opposite, oblong-lanceolate, acute or pointed, obtuse or obscurely cordate at the base, with short petioles. Umbels numerous, erect, mostly terminal, often in opposite pairs; flowers rose-purple, appearing in midsummer.

A somewhat variable species, sometimes more or less hairy-pubescent, again nearly smooth.

Habitat.—In wet, swampy places; common.

Asclepias tuberosa Linné.—*Butterflyweed—Pleurisy-Root.*

Description.—Hoods of the crown narrowly oblong, scarcely longer than the nearly erect, slender, pointed horns, bright orange; corolla lobes greenish-orange. Pods lanceolate, hoary. Stems numerous from a large fleshy rhizome, 1 to 2 feet high, very leafy. Leaves numerous, scattered, some of them opposite, oblong-lanceolate or linear, sessile or short-petioled. Umbels corymbose at the summit of the stem and branches; flowers very showy, appearing late in summer.

Habitat.—In dry fields, and along roadsides; common southward.

Part Used.—The root of A. tuberosa—*United States Pharmacopœia.* The roots of A. incarnata and A. cornuti were formerly official, but were dismissed from the Pharmacopœia in 1880. They are probably little less efficient than the official species.

Constituents.—A. tuberosa has yielded to analysis, besides common vegetable principles, two resins, and a peculiar principle possessing the taste of the root. The other species have been analysed with somewhat similar results.

Preparations.—None are official. They are commonly administered in decoction. Extracts and oleo-resinous preparations occur as commercial articles.

Medical Properties and Uses.—The various species of asclepias have been employed with diuretic, diaphoretic, expectorant, emetic, and even purgative effect. They have also been credited, though on insufficient grounds, with specific action in certain diseases. Their diaphoretic effects have been found useful in acute pulmonary and bronchial affections and in rheumatism.

OLEACEÆ.

Character of the Order.—Trees or shrubs with opposite, simple or compound leaves, and perfect or unisexual flowers. Calyx 4-cleft, sometimes obsolete. Corolla 4-cleft, or of 4 separate petals, sometimes wanting. Stamens 2, rarely 3 or 4. Ovary free, 2-celled, commonly 2-ovuled. Fruit drupaceous, baccate, capsular or samaroid.

An order, taking its name from the olive (*Olea Europœa*), which comprises about 20 genera and 150 species, mostly natives of temperate regions. Its most important representatives in North America are found in the genus

FRAXINUS.—ASH.

Fraxinus Americana Linné.—*White Ash.*

Description.—Calyx minute, 4-toothed, persistent. Corolla wanting. Stamens 2, rarely 3 or 4. Style single, stigma 2-cleft. Fruit a samara, flattened, winged at the apex, 1- to 2-seeded.

A large tree, 60 to 80 feet high, with gray furrowed bark, smooth gray branchlets, and rusty-colored buds. Leaves 12 to 14 inches long, unequally pinnate; leaflets 7 to 9, ovate or lance-oblong, pointed, entire, rarely denticulate, light-green above, pale and either smooth or pubescent underneath. Flowers diœcious, in crowded panicles or racemes, from the axils of the preceding year's leaves. Fruit terete below, expanded above into a lanceolate, oblanceolate, or wedge-linear wing.

Habitat.—River banks and margins of swamps from Canada to Florida.

Part Used.—The inner bark—not official.

Constituents.—Unknown.

Preparations.—It has been used in infusion and vinous tincture.

Medical Properties and Uses.—The bark of white ash has been used with asserted benefit in dysmenorrhœa, but as so many other drugs have attained a short-lived reputation in this affection, only to fall into disrepute when subjected to more extended experiments, this one may be expected to follow them. Still it appears desirable that the American ashes be investigated, since at least two European species are possessed of valuable medicinal properties, one of them, *F. ornus* Linné, furnishing the manna of commerce. Several of our species have been used to some extent, both in domestic and regular practice, but the results are as yet indefinite.

DIVISION III.—APETALOUS EXOGENOUS PLANTS.

Corolla wanting, the calyx being the only floral envelope; sometimes even this is absent, and then the flower is naked.

ARISTOLOCHIACEÆ.

Character of the Order.—Low herbs or twining plants with apetalous, perfect flowers. Calyx valvate in the bud, and coherent with the 6-celled ovary. Stamens 6 to 12, more or less united with the style. Fruit a 6-celled, many-seeded pod or berry.

A small order of chiefly tropical plants, represented in North America by two genera, namely Asarum and Aristolochia, both comprising medicinal species.

ASARUM.—WILD GINGER.

Asarum Canadense Linné.—*Wild Ginger.*

Description.—Calyx bell-shaped, 3-parted, the lobes pointed, abruptly spreading, dull purple inside; at each sinus is usually a small awl-shaped appendage. Stamens 12; filaments slender, united with the base of the styles, the latter united into one, 6-lobed at the summit, with 6 radiating stigmas. Fruit a fleshy, globular pod, bursting irregularly.

A low, stemless, perennial herb with a creeping rhizome. Leaves a single pair, radical, membranaceous, reniform, more or less pointed, 4 to 5 inches wide when full-grown, on long petioles. Flower solitary, on a short petiole, appearing early in spring.

Habitat.—In rich upland woods; common northward.

Parts Used.—The rhizome and rootlets. Formerly official but dropped from the Pharmacopœia in 1880.

Constituents.—An aromatic volatile oil and an acrid resin, besides common vegetable principles.

Preparations.—Commonly administered in infusion.

Medical Properties and Uses.—Wild ginger has a peculiar, pungent, aromatic taste, and is an aromatic stimulant. In hot infusion it produces diaphoresis, and may relieve the pains of colic. It is, however, less agreeable to most persons than many other drugs of its class, and scarcely deserves to rank as a medicinal agent.

ARISTOLOCHIA.—BIRTHWORT.

Aristolochia Serpentaria Linné.—*Virginia Snakeroot.*

Description.—Calyx tubular, contorted, bent in the shape of the letter *S*, dilated at both extremities, the limb 5-lobed, and somewhat 2-lipped. Stamens 6, the sessile anthers adherent to the 3-lobed sigma. Pod 6-valved, 6-angled, many-seeded.

A perennial herb. Stems several, from a short, fibrous-rooted rhizome; they are simple or slightly branched, flexuous, somewhat swollen at the joints, about one foot high, often tinged with red, especially near the base. Leaves alternate, ovate or oblong, cordate or halberd-shaped at the base, pointed, entire, petiolate. Flowers near the root, axillary, on short peduncles, of a stiff leathery texture and a dull brownish-purple color, appearing in midsummer.

Habitat.—In rich woods from Connecticut to Indiana and southward; most common along the Alleghanies.

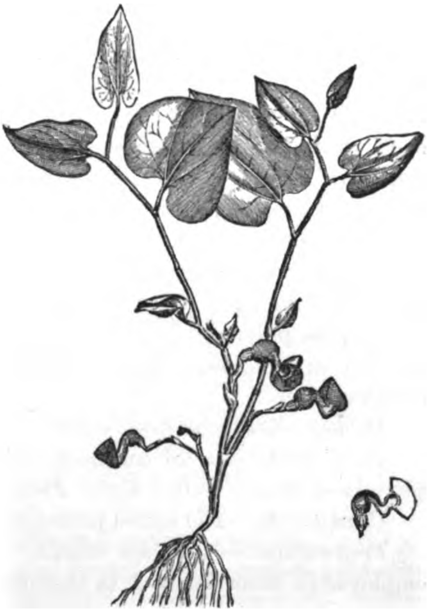


FIG. 150.—Aristolochia Serpentaria.

Parts Used.—The rhizome and rootlets. Official name: Serpentaria—*United States Pharmacopœia.*

Constituents.—A small proportion of volatile oil, an amorphous bitter principle, and common vegetable constituents.

Preparations.—Extractum serpentariæ fluidum—fluid extract of serpentaria; tinctura serpentariæ—tincture of serpentaria. One of the constituents of tinctura cinchonæ composita—compound tincture of cinchona.—*United States Pharmacopœia.* An infusion was formerly official.

Medical Properties and Uses.—Serpentaria is a stimulant tonic, but may also produce diaphoretic, diuretic, or emetic effects, according to the dose and manner of administration. It was formerly employed in fevers of a typhoid character, but is now little used, except in bronchial and pulmonary affections of an adynamic character.

PHYTOLACCACEÆ.

Character of the Order.—Herbs or undershrubs much resembling the following order—Chenopodiaceæ—but having a many-celled, many-ovuled ovary, which in fruit forms a berry. Represented in North America by the genus

PHYTOLACCA.—POKEWEED.

Phytolacca decandra Linné.—*Pokeweed, Scokeweed, Garget, Pigeonberry.*

Description.—Calyx: sepals 5, rounded, white, petaloid. Corolla absent. Stamens 10, rather shorter than the sepals. Ovary of 10 carpels united in a ring; styles 10, short, recurved. Fruit a depressed-globose berry, dark purple, 10-seeded.

A smooth, stout perennial herb with hollow stems and large fleshy roots. Stem much branched, 3 to 8 feet high, at first green but becoming purplish with age. Leaves scattered, ovate-oblong, entire, acute, smooth both sides, petiolate. Flowers in long racemes opposite the leaves, appearing in summer. The berries ripen in autumn, and are filled with crimson juice.

Habitat.—Common everywhere.

Parts Used.—Phytolaccæ bucca—phytolacca berry; phytolaccæ radix—phytolacca root—*United States Pharmacopœia.*

Constituents.—The active principle of poke has not yet been isolated.

Preparations.—None are official. Both the berries and root have been employed in decoction and in tincture, and the root has been used also in the form of an ointment.

Medical Properties and Uses.—All parts of the plant possess acrid and somewhat narcotic properties. The juice of the fresh plant, or a strong decoction of the root, applied locally, may strongly irritate the skin, especially if tender or abraded. Taken internally it produces nausea, vomiting, and purging, and, in overdoses, acro-narcotic poisoning. It has been employed with more or less satisfactory results in a great variety of cutaneous affections, and in rheumatism, especially when chronic or of a syphilitic origin. There is little doubt that, in view of the uncertainty which at present exists regarding it, this plant would well repay further careful experimentation.

CHENOPODIACEÆ.

Character of the Order.—Chiefly herbs, rarely undershrubs, with mostly alternate, exstipulate leaves. Calyx deeply divided, sometimes tubular at the base, persistent, commonly enclosing the fruit. Stamens generally of the same number as the lobes of the calyx, and inserted opposite them or on their base. Ovary free, 1-celled, with a single ovule attached to its base; styles or stigmas 2, rarely 3 to 5. Fruit a thin utricle, rarely an achenium.

A large order, comprising many common weeds, and a few plants, as the beet, spinach, and chenopodium of economic importance.

CHENOPODIUM.—GOOSEFOOT, PIGWEED.

Character of the Genus.—Calyx 5-cleft, rarely 2- to 4-cleft or parted, more or less enveloping the fruit. Stamens commonly 5. Styles 2, rarely 3. Seed round, flattened.

Coarse, weedy plants, usually somewhat succulent, and with a white mealiness, or viscid glandular. Flowers small, greenish, numerous, sessile, in clusters collected in terminal spikes.

Chenopodium ambrosioides Linné (**Var. Anthelminticum** Gray).—*Wormseed.*

Description.—Flowers mostly in leafless spikes. Stem erect, angular, sparingly branched, 1 to 3 feet high. Leaves ovate-oblong, acute, narrowed at the base, petiolate, deeply sinuate-serrate, the lower sometimes almost laciniate, pinnatifid, thin, smoothish, destitute of mealiness, glandular beneath, bright green. The whole plant has a strongly aromatic odor.

Habitat.—Introduced from Tropical America; common southward, in waste places.

Chenopodium album Linné.—*Pigweed, Lamb's Quarters.*

Description.—Flowers in dense or loose, nearly leafless racemes. Stem erect, sulcate-striate, loosely branched, 1 to 5 feet high. Leaves varying from rhombic-ovate to lanceolate or linear above, all or only the lower more or less sinuate-toothed, mostly with a pale mealiness. A very variable species.

Habitat.—A very common weed in cultivated grounds and about farm buildings.

Of these two species the first is introduced on account of its medicinal importance, and the second because it typifies a number of closely related species of common weeds, differing from the official plant in being mealy instead of viscid glandular.

Part Used.—The fruit of C. ambrosioides Linné, var. anthelminticum Gray. Official name: Chenopodium—*United States Pharmacopœia.*

Constituents.—Its only important constituent is a volatile oil.

Preparations.—Oleum chenopodii—oil of chenopodium.—*United States Pharmacopœia.* The bruised seeds are sometimes administered in substance or decoction.

Medical Properties and Uses.—Chenopodium is used solely as an anthelmintic for lumbricoid worms.

POLYGONACEÆ.

Character of the Order.—Herbs with alternate, commonly entire leaves, and stipules in the form of membranaceous sheaths above the swollen joints of the stem. Flowers commonly perfect. Calyx 3- to 6-cleft, more or less persistent. Stamens 4 to 12, inserted on the base of the calyx. Ovary free, 1-celled; styles or stigmas 2 or 3. Fruit a seed-like nutlet, commonly triangular.

An order comprising few North American genera, and these are largely represented by common weeds, many of them possessing more or less acrid properties. The most important plants of the order are buckwheat (*Fagopyrum*) and rhubarb (*Rheum*).

POLYGONUM.—KNOTWEED.

Character of the Genus.—Calyx commonly 5-parted, the lobes often petaloid, withering or persistent. Stamens 4 to 9. Styles or stigmas 2 or 3. Fruit a lenticular or triangular achenium, surrounded by the erect lobes of the calyx.

Polygonum Hydropiper Linné.—*Smartweed, Water-Pepper.*

Description.—Flowers mostly greenish, in nodding spikes, usually short or interrupted. Stamens 6. Style 2- to 3-parted. Achenium dull, minutely striate, flat or obtusely triangular. A smooth annual, 1 to 2 feet high. Leaves lanceolate, tapering to both ends, minutely pellucid-punctate.

Habitat.—In damp places; very common.

Polygonum acre H. B. K. (*P. punctatum* Elliott).—*Water Smartweed.*

Description.—Flowers whitish or flesh-colored, in erect spikes. Stamens 8. Style mostly 3-parted. Achenium smooth, shining, sharply triangular. A nearly smooth perennial. Stem ascending, rooting at the decumbent base, 2 to 5 feet high. Leaves larger and longer than in the preceding species.

Habitat.—In wet places; common, especially southward.

Polygonum Bistorta Linné.—*Bistort.*

Description.—Flowers pink or white in a dense oblong or cylindrical spike, 1 to 2 inches long, Styles 3. A perennial with a thick, cylindrical, somewhat flattened rootstock. Stem erect, simple, 1 to 2 feet high, terminating in a flower spike. Leaves mostly radical on long petioles, ovate-lanceolate or cordate, 5 to 6 inches long; stem leaves much smaller and on shorter petioles.

Habitat.—In the Rocky Mountain region and northward; common also in Northern Europe and Asia.

Parts Used—Of P. bistorta the root; of the other species, the herb—none are official.

Constituents.—Bistort contains a large percentage of tannic and gallic acids. Water pepper and water smartweed possess an acrid principle termed *polygonic acid*, to which they owe their medicinal virtues. This acid is also present in many other species of the genus, in a greater or less percentage.

Preparations.—Bistort is administered in powder, decoction, or extract. Water pepper and water smartweed are commonly administered in decoction, but as their active principle is dissipated by heat or long keeping, an alcoholic tincture, made from the fresh plant, is the best form in which to preserve them for any great length of time. In the country they are gathered and dried annually for domestic use, and do not seem to lose much of their efficiency during the few months that they are kept.

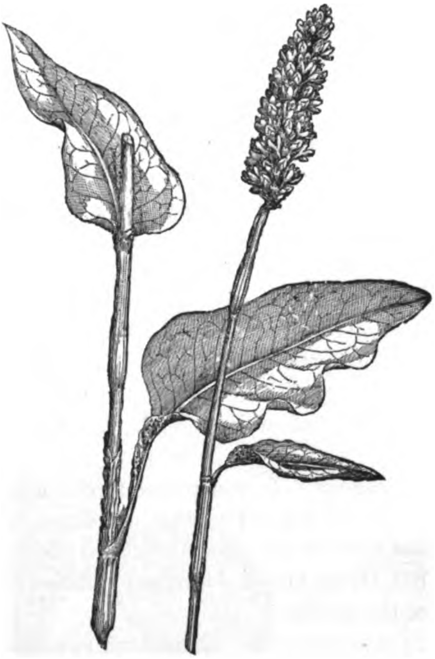


FIG. 151.—Polygonum Bistorta.

Medical Properties and Uses.—Bistort is used both topically and internally as an astringent, in the same manner as many other drugs rich in tannin. Water smartweed and water pepper have a burning, biting taste, inflame the skin when rubbed upon it, and possess somewhat acrid stimulating properties. They are employed in domestic practice, externally as counter-irritants, and internally to promote the menstrual flow, to induce diaphoresis in acute inflammatory affections, etc., in the same manner as other acrid and stimulating drugs are used.

RUMEX.—DOCK.

Character of the Genus.—Calyx of 6 sepals in two series of 3 each; the outer series herbaceous, the inner larger, somewhat colored, increasing in size after flowering, and converging over the triangular achenium. Stamens 6, styles 3; stigmas tufted. Herbaceous plants, many of them pestiferous weeds in cultivated fields, with small, homely, mostly greenish flowers in close panicled racemes.

Rumex crispus Linné.—*Curled Dock, Yellow Dock.*

Description.—Flowers in whorls, crowded in long, wand-like, leafless racemes. Inner sepals cordate, obscurely denticulate or entire, and commonly bearing a grain-like tubercle on the back.

A smooth perennial, with a deep, spindle-shaped, yellow root. Stem erect, 2 to 4 feet high, with few commonly erect branches. Leaves curled and wavy on the margins, lanceolate, acute, the lower truncate or obscurely cordate at the base, the upper smaller, narrower, and gradually passing into mere bracts.

Habitat.—Naturalized from Europe; common in cultivated and waste grounds.

Rumex orbiculatus Gray (*R. aquaticus* Pursh?)—*Great Water-Dock.*

Description.—Flowers in whorls crowded in upright, almost leafless racemes, which are arranged in a large, compound panicle; pedicels capillary, nodding, about twice the length of the fruiting calyx; inner sepals orbicular or round-ovate, obtuse, obscurely cordate at the base, membranaceous, finely reticulated, entire or repand-denticulate, each of them bearing a grain-like tubercle on the back.

A smooth perennial, with a deep, yellow root. Stem stout, erect, 5 to 6 feet high. Leaves smooth, not wavy on the margins, oblong-lanceolate, rather acute at both ends, the lowest, including the petiole, 1 to 2 feet long.

Habitat.—In wet places; common, especially northward.

Part Used.—The root of rumex crispus and of other species of rumex. —*United States Pharmacopœia.* Several other species may be employed, but those above described sufficiently represent the medicinal properties of the genus.

Preparations.—Extractum rumicis fluidum; fluid extract of rumex.—*United States Pharmacopœia.* It is also employed in the form of decoction and syrup.

Constituents.—Yellow dock closely resembles rhubarb in chemical composition, but is more astringent.

Medical Properties and Uses.—Yellow dock is tonic, astringent, and slightly laxative. These properties render it useful in a variety of chronic affections, such as scrofula, obstinate cutaneous diseases, dyspepsia, syphilis, etc., in which an alterative and depurative effect may be desired for a long time.

LAURACEÆ.

Character of the Order.—Trees or shrubs with simple, alternate, exstipulate, mostly pellucid-dotted leaves. Flowers often diœcious. Calyx of 4 or 6 sepals in two rows. Stamens 8 to 12, in two or more rows, the

3 or 4 innermost usually abortive; anthers opening by 2 or 4 uplifted valves. Ovary 1-celled, 1-ovuled; style solitary. Fruit a 1-seeded berry or drupe.

A large order of aromatic plants, chiefly tropical, represented in North America by only about half a dozen species. Of the tropical species the most important are *Camphora officinarum*, which yields gum-camphor, and the various species of *Cinnamomum*, from which are derived the cinnamon and cassia of commerce.

SASSAFRAS.

Sassafras officinale Nees.—*Sassafras.*

Description.—Flowers diœcious. Calyx 6-parted, spreading. Sterile flowers with 9 stamens in 3 rows, the inner row with a pair of stalked glands at the base of each; anthers 4-celled, 4-valved. Fertile flowers with 6 rudimentary stamens and an ovoid ovary. Fruit a blue, ovoid drupe, raised upon a reddish pedicel, which is thickened and cup-shaped at its extremity.

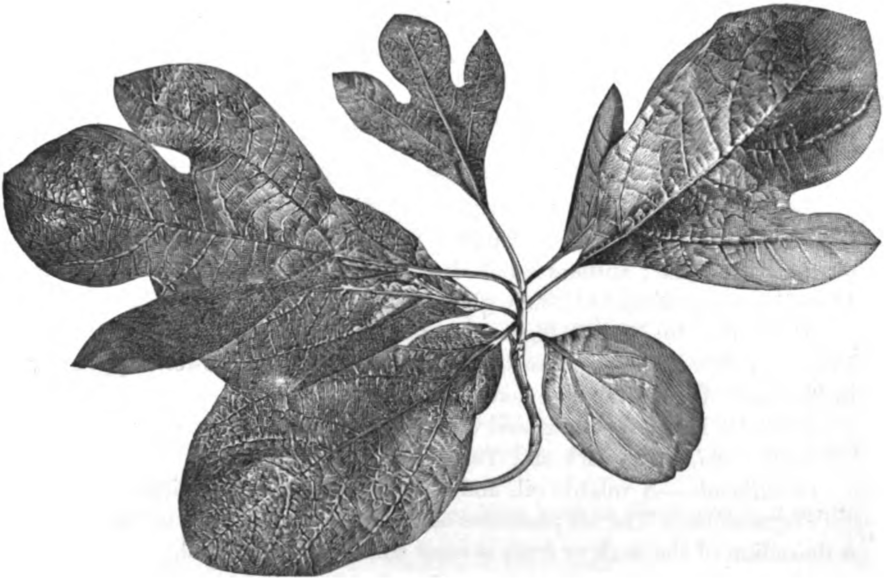


FIG. 152.—Sassafras officinale.

Northward commonly a tall shrub or small tree, 10 to 20 feet high; further south, and especially in rich soil, it often attains a height of 40 to 50 feet, with a diameter of 2 to 3 feet. Leaves 4 to 5 inches long, ovate and entire, or variously lobed; some of them regularly 3-lobed, others mitten-shaped. Flowers greenish-yellow, naked, clustered in peduncled corymbose racemes at the ends of the last year's branches, unfolding with the leaves in April and May. The twigs and young branches have a smooth yellowish-green bark, while that of the trunk is grayish and deeply furrowed.

Habitat.—From Canada to Florida; common.

Parts Used.—The bark of the root—official name, Sassafras; the pith of the young branches—official name, Sassafras medulla—*United States Pharmacopœia.*

Constituents.—Of the bark of the root, an aromatic volatile oil and the common constituents of plants. Of the pith, gummy matter, which is readily imparted to water, forming a limpid mucilage.

Preparations.—Of the bark of the root: Oleum sassafras—oil of sassafras. Of the pith: Mucilago sassafras medullæ—mucilage of sassafras pith.—*United States Pharmacopœia.*

Medical Properties and Uses.—Sassafras is an aromatic stimulant. Its chief use is, however, in the form of the oil, as a flavoring agent. Mucilage of sassafras pith is used as a demulcent in acute febrile and inflammatory affections.

LINDERA.—SPICE-BUSH.

Lindera Benzoin Meisner—*Spice-Bush, Wild Allspice, Fever-Bush.*

Description.—Flowers polygamous-diœcious. Calyx 6-parted, spreading. Sterile flowers with 9 stamens in 3 rows, the inner row bearing glands at the base; anthers 2-celled, 2-valved. Fertile flowers with 15 to 18 rudimentary stamens; ovary globular. Fruit a red, obovoid drupe.

A shrub 6 to 15 feet high. Leaves oblong-obovate, entire, smooth. Flowers yellow, in nearly sessile clusters, each of 4 to 6 flowers, appearing in March or April before the leaves.

Habitat.—In damp woods and copses; common.

Parts Used.—The bark and fruit—not official.

Constituents.—A volatile oil, and common vegetable principles.

Preparations.—The oil possesses all the medicinal virtues of the plant. A decoction of the bark or fruit is most commonly employed.

Medical Properties.—The bark of the spice-bush has a warm spicy taste, and in sufficient doses acts as a vascular stimulant. It has been employed to produce diaphoresis in acute inflammatory and febrile affections. The fruit has been employed as a substitute for allspice, and, medicinally, for the same purposes as the bark. The aroma of the plant is less pleasant than that of sassafras.

EUPHORBIACEÆ.

Character of the Order.—Plants with opposite or alternate, often stipulate leaves, commonly an acrid milky juice, and monœcious or diœcious, apetalous, sometimes naked flowers. Perianth, when present, lobed, and with glandular, scaly, or petaloid appendages. Stamens few or many, separate or united into one or more bundles. Ovary free, usually 3-celled, each cell with a single or sometimes a pair of suspended ovules; stigmas or branches of the style as many or twice as many as the cells. Fruit usually a 3-lobed pod, the lobes or carpels separating elastically from a persistent axis; seeds often arillate.

In the tropics a very large and important order, containing many acrid and poisonous plants. Represented in North America by only a few genera, comprising a small number of medicinal species.

EUPHORBIA.—SPURGE.

Character of the Genus.—Flowers monœcious, collected into heads, surrounded by a 4- to 5-lobed involucre, which resembles a calyx or corolla. Within the involucre are a number of stamens surrounding a stalked ovary, the whole resembling a single flower; but as each stamen is jointed on a pedicel, and proceeds from the axil of a bract, it is considered as a separate flower, hence each involucre includes a number of staminate flowers, each consisting of a single stamen, surrounding a solitary, stalked pistillate flower. Ovary 3-lobed, 3-celled; styles 3, each 2-cleft. Pod 3-lobed, splitting elastically into 3 one-seeded, 2-valved carpels.

A very large genus, represented in North America by numerous herbaceous species. All of them are characterized by a more or less acrid, milky juice.

Euphorbia corollata Linné.—*Large-Flowering Spurge.*

Description.—Stems several from a large branching root; erect, nearly simple, 2 to 3 feet high, glabrous or sometimes sparingly hairy. Leaves ovate, lanceolate, or linear, entire, obtuse, only the uppermost or floral ones whorled or opposite. Flowers in 5- to 7-rayed umbels, the rays 2- to 5-forked; involucres white, petaloid, showy, on long peduncles. Pod smooth, on a slender pedicel.

Habitat.—In rich or sandy soil from New York to Wisconsin and southward.

Euphorbia Ipecacuanhæ Linné.—*Ipecacuanha Spurge.*

Description.—Stems numerous from a long, deep perennial root, erect or diffusely spreading, 5 to 10 inches high, branching dichotomously from near the base. Leaves obovate, oblong, or narrowly linear, nearly sessile, glabrous, all or only the upper ones opposite. Peduncles axillary, elongated. Involucre petaloid, 4- to 5-lobed, with the same number of obtuse glands. Pod long-pedicelled, obtusely angled, nearly smooth.

Habitat.—In sandy soil near the coast from New York southward.

Several other indigenous species of euphorbia have been used medicinally, but those described above are believed to well represent the genus as found in North America.

Part Used.—The root of both species. Formerly official, but dismissed from the Pharmacopœia in 1880.

Constituents.—A perfectly satisfactory analysis of these plants is yet to be made. That they contain an emetic principle is very evident, but it has not yet been isolated.

Preparations.—Commonly administered in powder.

Medical Properties and Uses.—Both species possess similar if not quite identical properties, being actively emeto-cathartic; in small doses, diaphoretic. More pleasant to the taste than ipecacuanha; either of them may be substituted for it in cases where emesis is desired, and cathartic action is not objectionable.

STILLINGIA.

Stillingia sylvatica Linné.—*Stillingia, Queen's Root.*

Description.—Flowers monœcious, collected in a terminal spike. Calyx 2- to 3-cleft or parted. Corolla absent. Stamens, 2 to 3; anthers adnate, extrorse. Style single; stigmas 3, diverging. Pod 3-lobed, 3-celled, 3-seeded. Seed caruncυlate.

An herbaceous perennial. Stems 1 to 3 feet high, erect, smooth, from a very large tapering root. Leaves alternate, oblong-lanceolate, serrulate, nearly sessile, commonly with two glands at the base. Fertile flowers few, at the base of a dense sterile spike. The flowers are produced in summer.

Habitat.—In sandy soil from Virginia southward.

Part Used.—The root—*United States Pharmacopœia.*

Constituents.—Stillingia has a strong disagreeable odor, which is lessened by drying, and a bitter, acid, and pungent taste, which persists even when the dried root has been exposed to the air for a long time. It has yielded to analysis a volatile oil possessing the odor and taste of the crude drug, and a resinous body which also appears to possess medicinal activity. The so-called *oil of stillingia*, occurring as a commercial article, is said to be an ethereal extract, not without medicinal properties, but in no way resembling the true volatile oil.

Preparations.—Extractum stillingiæ fluidum—fluid extract of stillingia.—*United States Pharmacopœia.* It is also administered in decoction and syrup.

Medical Properties and Uses.—Stillingia, in large doses, is an active emeto-cathartic; in small doses, alterative. By that class of practitioners who reject mercury in the treatment of syphilis, stillingia is very largely employed as a substitute. In scrofula, chronic cutaneous and hepatic disorders, it is also said to act beneficially. In general terms, it may be said to have earned its present reputation and standing as a remedy in those cases which, in former times, were considered most amenable to sarsaparilla. Whether its reputation rests upon a more secure foundation than did that of sarsaparilla, is a question not easy to decide. One thing, however, must be conceded—stillingia is certainly not without activity. Now, while it is not claimed to act specifically in syphilis, the fact seems well established that in certain cases, by stimulating the secretory functions, it exerts a very beneficial influence. The same may be said of its action in scrofulous and cutaneous affections. It undoubtedly deserves more careful examination than it has hitherto had, in order that its sphere of usefulness may be more accurately defined.

URTICACEÆ.

Character of the Order.—Plants with alternate or opposite, stipulate leaves, and monœcious, diœcious or, rarely, perfect flowers. Calyx regular, monosepalous, or with 2 to 5 or more divisions. Stamens as many as the segments of the calyx, and opposite them. Ovary free, 1-celled, 1-ovuled, rarely 2-celled ; style or stigma simple. Fruit 1-seeded.

A very large order of chiefly tropical plants, comprising several well-characterized sub-orders. Not very well represented in North America.

ULMUS.—Elm.

Ulmus fulva Michaux.—*Slippery Elm, Red Elm.*

Description.—Flowers polygamous. Calyx bell-shaped, 7- to 9-lobed. Stamens 7 to 9, with long, slender filaments. Ovary 2-celled, each cell 1-ovuled ; styles 2, diverging. Fruit a 1-celled, 1-seeded, membranaceous samara.

A medium-sized tree, 20 to 60 feet high, 1 to 2 feet in diameter, with a rough, light-gray bark and reddish wood. Leaves alternate, 4 to 8 inches long, ovate-oblong, taper-pointed, doubly serrate, rough above, soft-downy beneath. Flowers reddish, pubescent, in lateral clusters, preceding the leaves in March and April.

Habitat.—In rich, rather dry soil, from Western New England to Lake Superior and southward.

Part Used.—The inner bark—official name, Ulmus—*United States Pharmacopœia.*

Constituents.—The only important constituent of slippery elm bark is an abundance of mucilage.

Preparations.—Mucilago ulmi—mucilage of elm.—*United States Pharmacopœia.* This is merely an infusion of the sliced bark in boiling water.

Medical Properties and Uses.—Slippery elm is demulcent and slightly nutritious. It is used largely in acute inflammatory and febrile affections, either alone or slightly acidulated with lemon-juice, and is one of the most valuable agents of its class, seldom or never deranging the stomach. Externally it is often employed in the form of a poultice, being first ground or torn into shreds, and made into a mass of proper consistence with boiling water. It has also been employed, in the form of tents, to dilate the neck of the uterus and fistulous tracts.

MORUS.—MULBERRY.

Morus rubra Linné.—*Red Mulberry.*

Description.—Flowers monœcious or diœcious. Staminate flowers in drooping axillary spikes ; calyx 4-parted ; stamens 4. Pistillate flowers in dense, ovate, erect spikes ; calyx of 4 sepals ; ovary 2-celled, one of the cells disappearing during the development of the fruit ; styles 2, filiform. When ripe each ovary is an achenium covered by the succulent calyx, the whole fertile spike becoming a dark-purple, juicy fruit resembling a blackberry.

A small tree 20 to 30 feet high. Leaves alternate, ovate, cordate, pointed, serrate, rough above, downy beneath ; those of the young shoots sometimes 2- to 3-lobed. The flowers appear in May ; the berries are ripe in July ; they are about an inch long, and have an agreeable sweetish and acidulous taste.

Habitat.—In rich woods from New England to Illinois and southward.

Part Used.—The fruit—not official.

Constituents.—Glucose, free acid, and mucilaginous matter.

Preparations.—Commonly used in the form of a syrup or expressed juice.

Medical Properties and Uses.—Mulberries are slightly laxative, and their mildly acid properties render them cooling and refreshing. They are chiefly employed in the preparation of refrigerant drinks in acute febrile and inflammatory affections.

URTICA.—NETTLE.

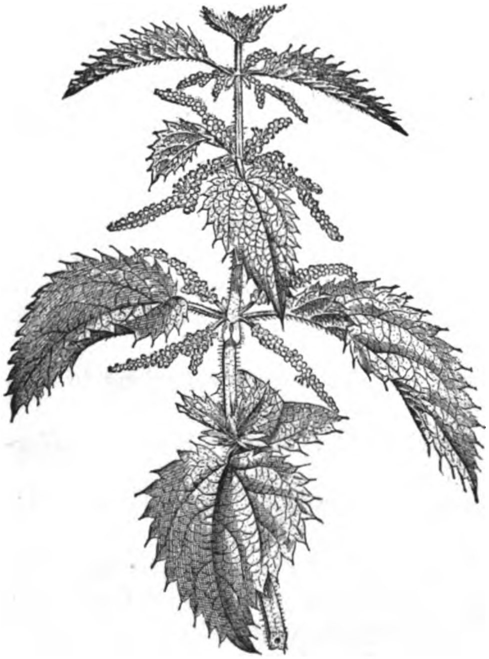


FIG. 153.—Urtica dioica.

Character of the Genus.—Flowers monœcious or diœcious, in axillary clusters or spikes. Staminate flowers ; stamens 4, inserted around the rudiment of a pistil. Pistillate flowers ; sepals 4, in pairs, the outer pair smaller, spreading, the inner, in fruit, enclosing the achenium.

Annual or perennial herbs, with stinging hairs. Leaves opposite, stipulate. Flowers greenish.

Urtica dioica Linné.—*Common Nettle.*

Stem erect, 2 to 4 feet high, very bristly. Leaves ovate, cordate, pointed, strongly serrate, mostly smooth above, downy underneath. Flower spikes much branched.

Habitat.—In waste places, especially about dwellings; introduced from Europe.

Urtica urens Linné.—*Dwarf Nettle.*

Stem erect, 8 to 12 inches high, less bristly than the preceding. Leaves elliptical or ovate, coarsely and deeply serrate. Flower clusters 2 in each axil, the staminate and pistillate flowers intermingled.

Habitat.—In waste places; introduced from Europe. Less common than the preceding.

Wood Nettle (*Laportea Canadensis* Gaudichaud), an indigenous plant, closely related to the genus urtica, also possesses stinging properties, and is probably hardly less efficient.

Parts Used.—The seed, leaves, and tops—not official.

Constituents.—The stinging hairs of nettles contain free formic acid, but as their effect upon the skin differs sensibly from that of pure formic acid, it is inferred that there is present also some other irritating substance.

Preparations.—The expressed juice, decoction, and the bruised leaves.

Medical Properties and Uses.—Flagellation of the skin with fresh nettles was formerly employed for counter-irritant effect in paralysis, and in coma whether produced by disease or by alcohol or opium. Internally the drug has been used with asserted benefit in hemorrhages from the nose, lungs, uterus, etc., and in catarrhal affections.

CANNABIS.—HEMP.

Cannabis sativa Linné.—*Hemp, American Hemp.*

Description.—Flowers diœcious. Staminate flowers with 5 sepals, and 5 drooping stamens. Pistillate flowers with a calyx of one sepal which is folded around the ovary; ovary roundish, 1-ovuled; stigmas 2, filiform, glandular. Achenium ovate, 1-seeded.

A coarse, pubescent, somewhat viscid annual. Stem erect, 3 to 6 feet high, angular, branching. Leaves alternate or opposite, on long weak petioles, digitate, with 5 to 7 linear-lanceolate, sharply serrate segments. Flowers in axillary clusters; staminate clusters lax, drooping, leafless at the base; pistillate, erect, leafy at the base.

Habitat.—In waste places. Largely cultivated in some of the Western and Southern States. Introduced from Europe.

Parts Used.—The flowering tops. Official name, Cannabis Americana—American Cannabis—*United States Pharmacopœia.*

This plant is specifically identical with that affording the Cannabis Indica (*Indian Hemp, Hashish*) of commerce, and has received the above pharmacopœial name simply for identification.

Constituents.—The constituents of American cannabis do not differ from those of Indian cannabis save, perhaps, in degree; authors pretty generally consider the latter more active than the former. The active properties of cannabis appear to reside chiefly in a resin which has received the name *cannabin;* but there is also found a small proportion of volatile oil possessing the characteristic odor and taste of the plant, and producing narcotic effects. Its remaining constituents are medicinally unimportant.

Preparations.—There are no official preparations of American cannabis. It may be employed in the same manner as Indian cannabis, namely, in extract, fluid extract, or tincture.

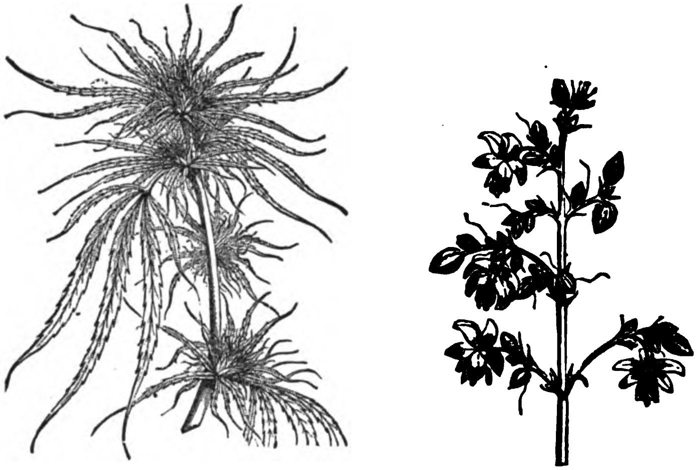


FIG. 154.—Cannabis sativa.

Medical Properties and Uses.—Cannabis, when fresh, has a peculiar narcotic odor, which is said to be capable of producing headache and other cerebral symptoms. This property is considerably diminished by drying and long keeping, hence the drug should be used as fresh as possible. Indeed, there is little doubt that much of the uncertainty of cannabis is dependent upon a want of care in this respect. Cannabis is a powerful narcotic, causing, first, exhilaration and delirious hallucinations, generally of a pleasurable character, and afterward drowsiness and stupor. Though much less certain than opium, it has none of the unpleasant after-effects of the latter, and is often used instead to relieve pain, allay spasm, and produce sleep.

HUMULUS.—HOP.

Humulus Lupulus Linné.—*Hop.*

Description.—Flowers diœcious. Staminate flowers with 5 sepals, and 5 erect stamens. Pistillate flowers with a single sepal, which embraces the ovary, grows with it after flowering, and covers the achenium at maturity.

A perennial plant, with annual, angular, rough, twining stems, which climb to the height of many feet. Leaves mostly opposite, on long, winding petioles, the smaller ones cordate, the larger 3- or 5-lobed, serrate, veiny, and very rough. Stipules, 2 or 4 between the petioles, cvate, reflexed, persistent. Staminate flowers in loose, axillary panicles; pistillate in catkins of numerous foliaceous, imbricated, concave bracts, each 2-flowered, forming, in fruit, membranaceous strobiles. The achenium, fruiting calyx, etc., are covered with yellow resinous grains, called *lupulin*.

Habitat.—The common hop is widely distributed over most temperate regions, growing in thickets without cultivation. It is indigenous to North America, being especially common in the northern and western portions of the United States. In some sections of the country it is extensively cultivated for use in brewing ale, beer, etc.

Parts Used.—The strobiles—official name, Humulus—Hops. The glandular powder separated from the strobiles—official name, Lupulinum—Lupulin.—*United States Pharmacopœia.*

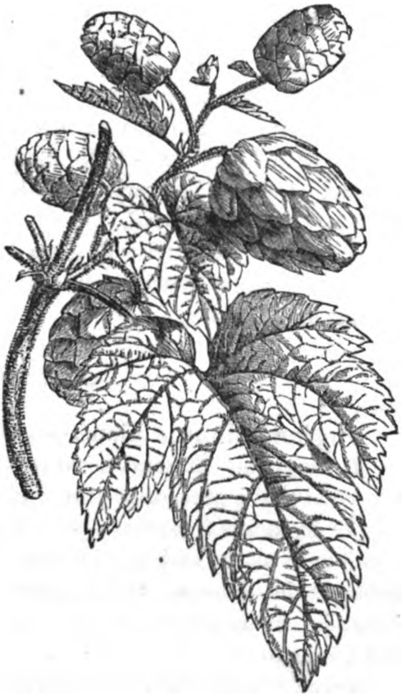


FIG. 155.—Humulus Lupulus.

Constituents.—Hops have a peculiar aromatic, somewhat narcotic odor, and an aromatic, bitter, astringent taste. These properties are more strongly marked in lupulin that in the strobiles after this has been separated from them. Lupulin constitutes from one-tenth to one-sixth the weight of hops, and contains, as its most important constituents, volatile oil, a peculiar bitter principle, and an alkaloid having an odor somewhat resembling that of *conia.* The scales of hops from which the lupulin has been separated possess the same active principles but in smaller proportions.

Preparations.—Of hops: Tinctura humuli—tincture of hops. Of lupulin: Extractum lupulini fluidum—fluid extract of lupulin; oleoresina lupulini—oleoresin of lupulin.—*United States Pharmacopœia.* An infusion of hops is also efficient and is often employed.

Medical Properties and Uses.—Hops are tonic and slightly narcotic. Their tonic influence has been found useful in debility of the digestive organs, while their narcotic and sedative effects seem most pronounced in irritable conditions of the genito-urinary tract. A pillow of hops is one of the standard remedies among the laity for sleeplessness, and is often used with the happiest effects. Hop fomentations are frequently employed to relieve the pain of abscesses and inflammations, and form an excellent application for the purpose.

JUGLANDACEA.

Character of the Order.—Trees with alternate, pinnate, exstipulate leaves. Flowers monœcious, the staminate in catkins, with an irregular calyx adnate to the bract; the fertile solitary or in small clusters or spikes, with a regular 3- to 5-lobed calyx adherent to the incompletely 2- to 4-celled, 1-ovuled ovary. Fruit a dry, bony-shelled drupe, containing a large 4-lobed, oily seed.

A small order of trees of great economic importance. Among its most important representatives in North America are the butternut, black-walnut and hickory.

JUGLANS.—WALNUT.

Juglans cinerea Linné.—*Butternut.*

Description.—Staminate flowers in long, simple, lateral catkins from the wood of the preceding year; calyx unequally 3- to 6-cleft. Stamens 12 to 40; filaments free, very short. Pistillate flowers solitary or clustered on a peduncle at the end of the branches; calyx 4-toothed, with 4 minute petals at the sinuses. Styles 2, very short; stigmas 2, club-shaped, slightly fringed. Fruit oblong, with a clammy, fibrous-fleshy epicarp, and a very hard, irregularly and deeply-furrowed endocarp, or nut-shell.

A tree 20 to 50 feet high, with gray bark and widely spreading branches. Leaves long, unequally pinnate; leaflets 15 to 17, the lateral sessile, the terminal petiolate, oblong-lanceolate, rounded at the base, acuminate, finely serrate, downy, especially beneath, the petioles and branchlets downy with clammy hairs.

Habitat.—In rich woods and in fields; everywhere common.

Part Used.—The inner bark of the root—*United States Pharmacopœia.*

Constituents.—The most important constituent thus far isolated from butternut bark is a volatile acid, called by its discoverer *juglandic acid*, but believed by other chemists to be identical with *nucin*, previously found in the pericarp and leaves of *Juglans regia* Linné. To this substance is doubtless due the greater part of the activity of the bark.

Preparations.—Extractum juglandis—extract of juglans.—*United States Pharmacopœia.*

Medical Properties and Uses.—Butternut is a mild cathartic, resembling rhubarb in the mildness of its action and freedom from irritating properties. It has been used with best effect in habitual constipation.

CUPULIFERÆ.

Character of the Order.—Trees or shrubs with alternate, simple, feather-veined leaves, furnished with very deciduous stipules, forming the bud-scales. Flowers monœcious; the staminate in catkins; the pistillate solitary, clustered or spiked, and provided with an involucre which forms a cup-like receptacle, or an entire covering to the 1-celled, 1-seeded nut. Calyx adherent to the ovary, the minute teeth crowning its summit. Ovary more or less 2- to 7-celled, each cell 1-ovuled, only one of which matures. Seeds comparatively large, thick and fleshy, often edible.

An order of few genera, but comprising many valuable species. The oak (*Quercus*), chestnut (*Castanea*), and beech (*Fagus*), are among the most important.

QUERCUS.—OAK.

Quercus alba Linné.—*White Oak.*

Description.—Staminate flowers in long, slender, pendulous catkins; stamens 5 to 12, surrounded by narrow scales which are sometimes united into an irregular perianth. Pistillate flowers scattered or clustered; perianth more or less 6-lobed, adherent to the ovary, which is about 3-celled, the whole enclosed by a scaly, bud-like involucre which becomes a hard, woody cup about the base of the rounded nut or acorn.

A large tree, sometimes growing to the height of 70 to 80 feet, with a diameter of 6 to 7 feet. Leaves ovate or obovate-oblong in general outline, obliquely and deeply cleft into 3 to 9 oblong, obtuse lobes. When young they are reddish above, whitish and downy beneath, but at maturity bright green above, and smooth, pale, or glaucous beneath. Cup hemispherical-saucer-shaped, rough or tuberculated at maturity, naked, much shorter than the ovoid or oblong (1 inch long), sweetish, edible acorn. The bark is very light-colored, whence the specific name of the tree.

Habitat.—From Canada to Florida and westward; common.

Part Used.—The bark, deprived of the corky layer—official name, Quercus alba.—*United States Pharmacopœia.*

Constituents.—The only important constituent of oak bark is tannin.

Preparations.—There are no official preparations. It is usually employed, whether internally or topically, in decoction.

Medical Properties and Uses.—Oak bark is astringent by virtue of its tannin, and is used for the same purposes as other vegetable astringents. The decoction is sometimes employed externally to prevent the formation of bed-sores.

Many other indigenous species of oak possess essentially similar properties.

CASTANEA.—CHESTNUT.

Castanea vesca Linné.—*Chestnut.*

Description.—Staminate flowers clustered upon long, pendulous catkins; calyx commonly 6-parted; stamens 8 to 20. Pistillate flowers few, usually three together in a scaly, prickly involucre, which encloses them, and at maturity opens by 4 valves; calyx with a 6-lobed border which crowns the 3- to 7-celled, 6- to 14-ovuled ovary; stigmas as many as the cells of the ovary, and surrounded by 5 to 12 rudimentary stamens. Nuts coriaceous, ovoid, flattened, 1 to 3 in number, sweetish, edible.

A large tree, 30 to 50 feet in height, with a diameter of 3 to 6 feet. Leaves 6 to 7 inches long, 1½ to 2 inches wide, oblong-lanceolate, acuminate, sharply serrate, very regularly feather-veined, when mature, smooth and yellowish-green both sides. It blooms in June and July and matures its fruit after frost, when the burrs open and the nuts fall.

Habitat.—In rocky and hilly places, and in alluvial or sandy soil; widely distributed, and often associated with oak and pine.

Part Used.—The leaves, collected in September or October while still green. Official name—Castanea.—*United States Pharmacopœia.*

Constituents.—Nothing save common vegetable principles have as yet been detected in chestnut leaves.

Preparations.—Extractum castaneæ fluidum—fluid extract of castanea. —*United States Pharmacopœia.*

Medical Properties and Uses.—There is much doubt regarding the medicinal activity of chestnut leaves. Introduced as a remedy for whooping-cough, the drug was considerably lauded for a time, but its slight popularity seems already waning. In absence of anything to establish the presence of a therapeutically active principle, or of physiological experiments to prove its activity, the mere statement that it exerts a controlling influence upon a disease of such uncertain course as whooping-cough may well be received with caution.

MYRICACEÆ.

Character of the Order.—Monœcious and diœcious shrubs, with both staminate and pistillate flowers in short scaly catkins. Leaves alternate, resinous-dotted, and often fragrant.

A small order having few representatives in North America. In general they possess, to a greater or less degree, aromatic, astringent, and stimulant properties.

MYRICA.—BAYBERRY.

Myrica cerifera Linné.—*Bayberry, Wax-Myrtle.*

Description.—Flowers mostly diœcious. Staminate catkins oblong, scattered; pistillate ovoid, from scaly, axillary buds. Both kinds destitute of calyx and corolla, the solitary flowers being placed each under a scaly bract, with a pair of bractlets. Stamens 2 to 8. Ovary with 2 to 4 scales at its base; stigmas 2. Fruit an ovoid nut or drupe, covered with whitish wax.

A shrub, 3 to 8 feet high. Leaves oblong-lanceolate, narrowed at the base, entire or somewhat toothed toward the apex, shining and resinous-dotted both sides, fragrant, appearing late in April before the flowers. Nuts scattered or clustered along the last year's branches, sometimes persisting for two or three years.

Habitat.—In sandy or rocky places on or along the coast.

Parts Used.—The bark and wax—not official.

Constituents.—Besides common vegetable principles, there are in bayberry bark an acrid resin, an astringent resin, and a peculiar acrid acid, termed *myricinic acid.* Myrtle wax in mass, after separation from the fruit, is greenish-gray in color, with a consistence intermediate between that of beeswax and tallow. It burns with a white flame and a fragrant odor.

Preparations.—There are no official preparations. The bark has been used chiefly in powder and in decoction.

Medical Properties and Uses.—Bayberry bark is an acrid stimulant and astringent. In moderate doses it produces a sensation of heat in the stomach; in large doses, nausea and vomiting. The powder is very irritating to the nasal mucous membranes, and produces violent sneezing. It has been employed to some extent in a great variety of diseased conditions, but without acquiring reputation in any. Bigelow stated, sixty years ago, as the result of his investigations, that it is "more interesting in a chemical than a medical point of view;" and his statement, in the present state of our knowledge, scarcely requires comment or revision.

COMPTONIA.—SWEET-FERN.

Comptonia asplenifolia Aiton.—*Sweet-Fern.*

Description.—Flowers monœcious and diœcious. Staminate flowers in cylindrical catkins with imbricated, concave, reniform, acuminate, 1-flowered scales; stamens 3 to 6. Pistillate flowers in egg-shaped, burr-like catkins; ovary surrounded by 8 long, linear, awl-shaped scales, which are persistent around the ovoid-oblong, smooth, 1-seeded nut.

A low shrub, 1 to 3 feet high, slender, branched, somewhat hairy. Leaves alternate, linear-lanceolate, 3 to 4 inches long by half an inch broad, deeply pinnatifid with many rounded lobes, resembling those of a fern. This resemblance, together with the fragrance of the leaves, has given the plant the popular name of *sweet-fern.*

Habitat.—In dry sterile or sandy soil from Virginia to Wisconsin and northward.

Parts used.—The leaves and tops—not official.

Constituents.—The most important constituents are volatile oil and tannin.

Preparations.—Commonly used in decoction.

Medical Properties and Uses.—Sweet-fern is stimulant and astringent. It is occasionally employed as a domestic remedy in diarrhœa, colic, etc.

BETULACEÆ.

Character of the Order.—Trees or shrubs with simple, alternate, stipulate leaves, often strongly feather-veined. Flowers monœcious, in scaly catkins, 2 or 3 under each bract, and without a perianth. Ovary 2-celled; stigmas 2. Fruit a dry, 1-celled, 1-seeded, often winged nut.

A small order inhabiting chiefly the northern temperate regions.

BETULA.—BIRCH.

Betula lenta Linné.—*Sweet, Black,* or *Cherry Birch.*

Description.—Staminate flowers 3, under each scale of the catkin, each with 4 short stamens. Pistillate flowers 2 or 3 under each scale of the catkin, each consisting of a naked ovary which, in fruit, becomes a winged nutlet or samara.

A medium-sized tree with brownish-red, cherry-like bark. Leaves ovate or oblong-ovate, cordate, acuminate, sharply serrate, smooth and shining above, glabrous beneath. Sterile catkins long and drooping, terminal and lateral, formed in summer, and expanding the following spring. Fertile catkins oblong-cylindrical in fruit, usually terminal on short lateral branches of the season. Bark, of the younger branches especially, aromatic, having the odor and taste of gaultheria. When wounded the stem yields a saccharine juice.

Habitat.—In moist woods from New England to Illinois northward, and along the Alleghanies southward.

Parts Used.—The bark, leaves, and saccharine juice—not official.

Constituents.—The bark and leaves, by distillation, yield a volatile oil identical in composition with that obtained from gaultheria, and, it is said, frequently sold for the latter.

Preparations.—Commonly used in decoction. The oil evidently possesses all the virtues of the drug, and is therefore the most efficient preparation.

Medical Properties and Uses.—The white birch of Europe (*Betula alba* Linné) and the related American species, *Betula alba*, var. *Populifolia* Spach, and Betula lenta L., have been considered purifiers of the blood, and have been employed as domestic remedies in rheumatism, gout, cutaneous affections, etc. Whatever virtues they possess are probably due to their volatile oil, and as this is identical with that of gaultheria, their therapeutic effects must necessarily be similar.

ALNUS.—ALDER.

Alnus serrulata Aiton.—*Black Alder, Tag Alder.*

Description.—Staminate flowers 3, rarely 6, under each scale of the catkin; calyx 3- to 5-parted; stamens as many as the lobes of the calyx, with short filaments. Pistillate flowers 2 to 3 under each scale of the catkin; calyx of 4 small scales, adherent to the scales of the catkin.

A slender shrub, 6 to 12 feet high. Leaves obovate, acute at the base, rounded or blunt at the apex, sharply serrate, somewhat coriaceous, green both sides, smooth or downy beneath. The flowers appear early in spring before the expansion of the leaves, the staminate ones in long drooping catkins, the pistillate, in short erect ones, which, in fruit, are ovate, and persist for a long time upon the stem.

Habitat.—Common in swamps and along the marshy borders of streams, from Southern New England to Wisconsin and southward.

Part Used.—The bark—not official.

Constituents.—The only important constituent of alder bark thus far discovered is tannin.

Preparations.—Commonly used in decoction.

Medical Properties and Uses.—Alder bark is alterative and astringent. It is said to have been used in diarrhœa, and hæmaturia. In some sections of the country it is largely employed in domestic practice as a purifier of the blood, both for the human subject and domestic animals. The author has seen it employed many times in persons afflicted with successive crops of boils, with the happiest effect. Evidently such effects could not have been produced by the tannin which it contains, hence there is probably present some other principle of an active character which has not as yet been isolated.

Other species of alnus, both indigenous and exotic, possess similar properties.

SALICACEÆ.

Character of the Order.—Trees or shrubs with alternate simple, stipulate leaves. Flowers diœcious, in catkins, one under each bract, entirely destitute of a floral envelope. Fruit a 1-celled, 2-valved, many-seeded pod, the seeds provided with long silky down.

A small order comprising two genera, namely, Salix and Populus. All of them possess, to a greater or less extent, bitter tonic properties.

SALIX.—WILLOW.

Character of the Genus.—Scales of the catkin entire. Staminate flowers of 2 to 10 distinct or united stamens, with 1 or 2 small glands. Pistillate flowers with a small, flat gland at the base of the ovary.

A very large genus of shrubs and trees, growing chiefly along water-courses in the northern temperate zone, but some inhabit high mountains, and one is found nearer the north pole than any other shrubby plant. All known species are bitter, and contain *salicin* in a greater or less proportion. The one in which this principle is most abundant, and which has therefore been chiefly employed medicinally, is:

Salix alba Linné.—*White Willow.*

Description.—Catkins long, loose, pedunculate, borne on the summit of the lateral leafy branches of the season. Scales entire, greenish-yellow, more or less hairy, falling before the pods are ripe. Stamens mostly 2; filaments hairy below. Ovary short-stalked or nearly sessile, glabrous; stigmas thick, recurved.

A tree, 50 to 80 feet high. Leaves lanceolate or elliptic-lanceolate, pointed, somewhat toothed, clothed more or less with white, silky hairs, especially beneath.

Habitat.—Introduced from Europe, but naturalized and very common in moist situations.

The indigenous species of willow are very numerous, and many of them are very common, but, as few of them have ever been employed medicinally, they need not occupy our attention here.

Part Used.—The bark of salix alba and of other species of salix.—*United States Pharmacopœia.*

Constituents.—Willow bark contains as its most important constituent, *salicin.* This, as remarked above, has been found in all species which have been examined. On this account the Pharmacopœia recognizes not only salix alba, but "other species." The bark also contains considerable tannin, and common vegetable principles.

Preparations.—None are official. It has been employed in powder, decoction, and infusion. The active principle, salicin, is the most eligible and efficient form in which to employ it.

Medical Properties and Uses.—Willow bark is tonic and antiperiodic. It has been used in intermittents, and as a tonic in dyspepsia, debility, and convalescence. Recently salicin has been employed with asserted benefit in rheumatism.

POPULUS.—POPLAR.

Character of the Genus.—Scales of the catkins jagged or irregularly cut-lobed at the apex. Flowers in a cup-shaped disk; the staminate with 4 to 30 stamens; the pistillate of a single pistil. Trees with broad, more or less cordate leaves, the petioles often compressed laterally, thus occasioning a tremulous motion when the least agitated. Catkins long and drooping, appearing before the leaves.

Populus tremuloides Michaux.—*American Aspen.*

Description.—Scales of the catkins in 3 or 4 linear divisions, fringed with long hairs. A tree, 20 to 50 feet high, with smooth, greenish-white bark. Leaves roundish-cordate, acuminate, serrate, smooth both sides, downy on the margins; petioles long, slender, laterally compressed, so that the gentlest breeze suffices to keep the leaves constantly agitated.

Habitat.—In woods and copses ; common.

Populus balsamifera Linné.—*Balsam Poplar, Tacmahac.*

Description.—Scales of the catkins dilated, slightly hairy. A tree, 40 to 80 feet high. Leaves ovate, acuminate, serrate with appressed teeth, smooth both sides, green above, white and reticulate-veiny beneath. In spring the buds are covered with an aromatic resin.

Habitat.—In moist soil, Northern New England to Wisconsin and northward.

A variety of this species (*P. candicans* Aiton—*Balm of Gilead*) differs in having the leaves broader and somewhat cordate ; it is common in cultivation as a shade tree.

Parts Used.—Of P. tremuloides, the bark ; of P. balsamifera the resinous exudation of the buds—neither is official.

Constituents.—The bark of all species of poplar contains a crystalline principle, termed *populin*, closely resembling salicin. The resin of the balsam poplar does not differ materially in composition from other aromatic resins.

Preparations.—Poplar bark is commonly administered in decoction or infusion. The resin of the balsam poplar is readily separated from the buds by boiling them in water ; it may then be dissolved in alcohol, and administered in this form, or a tincture of the entire buds may be employed.

Medical Properties and Uses.—Poplar bark is a bitter tonic, acting like willow-bark, and possessing feeble antiperiodic properties. It is little used.

Poplar balsam is reputed tonic and stimulant. It was formerly used to a limited extent in pharmacy, to prevent ointments becoming rancid.

CONIFERÆ.

Character of the Order.—Monœcious, rarely diœcious, trees or shrubs ; flowers in catkins, destitute of calyx and corolla ; stamens inserted on the axis of the catkin under the scales, or the anther-cells are sessile on the scales themselves ; ovules and seeds naked. Leaves mostly awl-shaped or needle-shaped. Juice commonly resinous.

A large order, dispersed over all parts of the globe, most abundant in temperate regions, but extending also to the tropics and frigid zones. It comprises three well-marked sub-orders, namely : **Abietineæ,** *Pine Family ;* **Cupressineæ,** *Cypress Family ;* **Taxineæ,** *Yew Family.*

ABIETINEÆ.

Character of the Sub-Order.—Ovules 2, inverted, in the axil of a scale or bract; bracts imbricated, in fruit forming a woody cone.

PINUS.—PINE.

Character of the Genus.—Sterile catkins clustered about the base of the young current-year shoots; the fertile at the apex, and maturing the following year. Leaves 2 to 5 in a cluster, sheathed at the base by thin, chaff-like persistent scales.

Trees of a gregarious habit, often forming large forests; found only in the Northern hemisphere.

Pinus australis Michaux (*P. palustris* Linné.)—*Long-leaved* or *Yellow Pine.*

Description.—Cones 6 to 10 inches long, cylindrical or conical-oblong, the thick scales armed with a short recurved spine. Leaves in clusters of 3, 10 to 15 inches long, with long sheaths, crowded at the summit of thick and very scaly branches. A tree 60 to 80 feet high, with thin-scaled bark and very resinous wood, dividing near the summit into a number of spreading branches.

Habitat.—From Southern Virginia southward, growing in sandy soil, and often forming forests many miles in extent.

Pinus Tæda Linné.—*Loblolly* or *Old-field Pine.*

Description.—Cones 3 to 5 inches long, elongated-oblong, tapering, the scales tipped with a stout incurved spine. Leaves in clusters of 2 or 3, 6 to 10 inches long, with long sheaths. A tree 50 to 100 feet high, with very thick, furrowed bark, and sparingly resinous wood; when growing in fields it is low, with spreading branches.

Habitat.—In light soil, from Delaware southward; often establishing itself in fields exhausted by cultivation, hence called old-field pine.

The above-described species may be taken as fairly representing the medicinal trees of the genus, though many others possess similar or identical properties. Recognizing this fact, and that the medicinal derivatives of pine are procured from a variety of species, the United States Pharmacopœia mentions by name only the most important, *Pinus australis*, but adds, "other species of pinus."

Parts Used.—The medicinal virtues of pine reside in its oleo-resin. This exudes in greater or less quantity from all species when wounded, most abundantly, however, from P. australis, and is official under the name terebinthina—turpentine. From it are procured oil of turpentine and resin, while from the wood itself tar is obtained by the process of destructive distillation.

Constituents.—Turpentine, as it exudes from the tree, is a yellowish, viscid, somewhat opalescent liquid, of an agreeable odor and a pungent, bitterish taste. Exposed to the air for a length of time it concretes, and forms a tough mass which is brittle when cold. It consists of volatile oil and resin. The former is separated by distillation, and is the spirit of turpentine of commerce, while the latter is the non-volatile residue, commercially known as rosin. Tar is an empyreumatic oleoresin of very complex composition, containing acetic acid, methylic alcohol, creasote, carbolic acid, etc.

Preparations.—Of turpentine: Oleum terebinthinæ—oil of turpentine. resina—resin. Preparations of oil of turpentine: Linamentum cantharidis—cantharides liniment; linamentum terebinthinæ—turpentine liniment. Preparations of resin: Ceratum resinæ—resin cerate; emplastrum resinæ—resin plaster. Preparations of tar: Syrupus picis liquidæ—syrup of tar; unguentum picis liquidæ—tar ointment.—*United States Pharmacopœia.*

Medical Properties and Uses.—Crude turpentine is seldom or never used internally at the present day; since its virtues are believed to reside chiefly in its essential oil, this is almost universally employed instead. Oil of turpentine is stimulant, diuretic, anthelmintic, and, in large doses, cathartic; externally it is rubefacient and mildly vesicant. In small, frequently repeated doses it stimulates the kidneys, augments the secretion of urine, and occasionally produces strangury and hæmaturia. In large doses it produces vertigo, nausea, and often brisk catharsis. It is used in a great variety of cases. Like other terebinthinate medicines it is often employed in the later stages of gonorrhœa, and in other catarrhal affections. In typhoid fever, and in other affections where tympanites is a prominent and distressing symptom, it often affords great relief; and, indeed, in low typhoid conditions generally its employment is commonly very satisfactory. Its controlling influence in passive hemorrhages has also long been recognized and made use of. As a vermifuge it often enters into the composition of draughts for the expulsion of tænia. Externally, alone or in combination, it is largely employed as a rubefacient.

Resin is employed as an ingredient of plasters and cerates, to which it gives consistence and adhesiveness, without adding sensibly to their activity.

The medicinal properties of tar are similar to those of turpentine, modified, however, to some extent by the purely empyreumatic bodies which it contains. It is used internally and by inhalation in chronic catarrhal affections, and externally in a variety of cutaneous diseases.

ABIES.—SPRUCE.

Character of the Genus.—Sterile catkins scattered or clustered in the axils of the leaves of the preceding year; fertile catkins lateral or terminal on the branches of the preceding year; both appearing in spring, the cones maturing in the autumn of the same year. Scales of the cones thin, not tipped, as in the pine, with a thickened spine. Leaves rigid, foliaceous, scattered, not fasciculate, persistent for two or three years.

Abies balsamea Marshall.—*Balsam Fir.*

Description.—Cones cylindrical, 2 to 4 inches long, erect on the upper side of the spreading branches; scales mostly deciduous from the persistent axis at maturity. Leaves ½ to ¾ inch long, narrow, flat, rigid, bright green above, silvery beneath, mostly sessile on horizontal branches, and spreading in two directions so as to seem 2-ranked.

A slender, tapering tree, rarely more than 40 feet high; branches diminishing in length in proportion to their height from the ground, forming, under favorable circumstances, a perfectly regular pyramidal head. Bark rather smooth, bearing resin in vesicles.

Habitat.—In cold damp woods and swamps from New England to Pennsylvania, Wisconsin, and northward; common in Canada, not forming forests but disseminated among other trees.

Abies Fraseri Pursh.—*Fraser's* or *Southern Balsam Fir.*

Description.—Cones oblong-ovate, 1 to 2 inches long, otherwise much like the preceding. A small tree.

Habitat.—In the mountains from Pennsylvania to North Carolina.

Abies Canadensis Michaux.—*Hemlock, Hemlock Spruce.*

Description.—Cones oval, ½ to ¾ inch long, hanging on the ends of the branches of the preceding year, persistent; scales not falling away from the axis. Leaves linear, obtuse, ½ inch long, scattered, somewhat 2-ranked, dark green above, paler beneath. A large tree, often 70 to 80 feet high, with a diameter of 2 to 3 feet; in forests, with spreading branches at the top. Bark rough and deeply-furrowed; wood light, coarse-grained, but comparatively strong, largely used for fences and outbuildings.

Habitat.—In hilly and rocky soil. In many regions it forms forests of considerable extent, especially on west hillsides. Most common northward. It is approaching extinction in many sections of the Northern United States, since it does not flourish as a second-growth tree.

Parts Used.—The resinous exudation of all species. That procured from A. balsamea is official under the name Terebinthina Canadensis—Canada turpentine, or Canada balsam. It is contained in blisters or vesicles upon the bark and is collected by puncturing these and pressing out their contents. A. Fraseri yields a balsam of identical character. The resinous exudation of A. Canadensis is official under the name Pix Canadensis—Canada pitch or hemlock pitch.

Constituents.—Canada turpentine is a yellowish or faintly greenish, transparent, viscid liquid, of an agreeable terebinthinate odor, and a bitterish, slightly acrid taste. Exposed to the air it slowly concretes, and forms a mass which is brittle when cold. It is composed of volatile oil and resin.

Canada pitch is in opaque, reddish-brown masses, hard and brittle at ordinary temperatures, but readily softening by the application of little heat. It contains resin, and a minute proportion of volatile oil.

Preparations.—Of Canada turpentine: none. Of Canada pitch: Emplastrum picis Canadensis—Canada pitch plaster.—*United States Pharmacopœia.*

Medical Properties and Uses.—Canada turpentine does not differ materially in action from common turpentine, and is seldom employed medicinally. Canada pitch, applied externally in the form of a plaster, produces mild rubefaction, by virtue of its volatile oil. It is employed to some extent as a substitute for Burgundy pitch, the product of *A. excelsa* of Europe.

The bark of A. Canadensis is very astringent and is largely used in tanning. An extract prepared from it occurs as a commercial article and has been employed to some extent as a topical astringent. It appears to have no advantages over other common vegetable astringents.

LARIX.—LARCH.

Larix Americana Michaux.—*American Larch, Tamarack.*

Description.—Catkins terminating short lateral branches of the preceding year, the sterile from leafless buds, the fertile mostly with leaves below; cones ovoid, ½ to ¾ inch long; scales few, rounded, not thickened. Leaves needle-shaped, soft, fasciculate, deciduous. A tall, slender tree, with horizontal branches, and thin scaly bark, from which exudes an aromatic resin.

Habitat.—In swamps and marshy borders of small lakes and ponds from New England to Pennsylvania and Wisconsin; most common northward. It attains its greatest perfection in peat swamps; indeed, an abundant growth of this tree in a swamp is almost certain evidence of a deposit of peat.

Parts Used.—The inner bark and the resinous exudation—not official.

Constituents.—It does not appear that an analysis of the bark of the American larch has yet been made. The bark of an allied European species *L. Europœa* contains tannin of a peculiar character, and another acid principle allied to pyrogallic acid and pyrocatechu. The resinous exudation contains resin and a small quantity of volatile oil.

Preparations.—The bark is commonly employed in decoction. The resinous exudation, is an article of commerce under the name of tamarack, or spruce gum. It is prepared, generally by sophistication with other cheaper substances, for use as chewing-gum.

Medical Properties and Uses.—Little is known of the therapeutic properties of tamarack bark, though it is said to be laxative, tonic, diuretic, and alterative. Tamarack gum has no inherent medicinal properties. Being chewed, it stimulates the salivary secretion, and to some dyspeptics affords a certain amount of relief; but whether this is because of the increased flow of saliva, or that the act of chewing keeps their minds off the subject of digestion, which consequently goes on more smoothly, are questions not easily answered. That some dyspeptics are relieved by the practice is certain. And yet, it may be well to add, tamarack gum is chiefly chewed, not for medicinal purposes, but simply as a habit.

CUPRESSINEÆ.

Character of the Sub-Order.—Fertile flowers, consisting of a few carpellary scales, without bracts, bearing single or several erect ovules on their face, forming a closed strobile, or a sort of drupe in fruit.

THUJA.—ARBOR VITÆ.

Thuja occidentalis Linné.—*American Arbor Vitæ, Yellow Cedar, White Cedar.*

Description.—Flowers mostly monœcious on different branches, in small, terminal, ovoid catkins. Stamens with 4 anther cells. Fertile catkins, with a few imbricated scales, each bearing two ovules. Cones small; scales smooth, not thickened; seeds winged all around. Leaves appressed, closely imbricated in 4 rows on the 2-edged branchlets, persistent, evergreen, shining.

A tree, 30 to 50 feet high, with a rapidly tapering trunk, and horizontal or declinate branches, often from base to summit. Wood light, somewhat resinous, very durable.

Habitat.—In deep, cold swamps, often associated with tamarack, and on wet, rocky banks; common.

Parts Used.—The fresh tops (small branchlets with their covering of imbricated leaves)—*United States Pharmacopœia.*

Constituents.—Thuja has a balsamic, somewhat terebinthinate odor, and a pungently aromatic, camphoraceous and bitter taste. It has yielded to analysis volatile oil, a peculiar crystalline principle termed *thujin*, and common vegetable principles.

Preparations.—There are no official preparations. Fluid extracts and tinctures occur as commercial articles. These should be made from the fresh drug.

Medical Properties and Uses.—Thuja possesses stimulating properties similar to those of terebinthinate drugs generally, but is probably more nearly allied to savine in its action than to any other remedy of the class. It has been employed in amenorrhœa, catarrhal affections, passive hemorrhage, etc. Externally it is useful in repressing fungous granulations, removing warts, etc.

Thuja should be carefully distinguished from *Cupressus thyoides*, also, and more properly called, white cedar.

JUNIPERUS.—JUNIPER.

Character of the Genus.—Flowers diœcious, occasionally monœcious, in very small lateral catkins. Anthers 3 to 6, one-celled, inserted in the lower edge of the scales. Fertile flowers few in a small ovoid catkin, of 3 to 6, fleshy coalescent scales, each one-ovuled. Fruit berry-like, though in reality a reduced fleshy cone, with scaly bracts at the base, black with a whitish bloom.

Evergreen shrubs or trees with small, scale-like leaves.

Juniperus communis Linné.—*Common Juniper.*

Berries globular, one-third inch in diameter, dark-purplish, and covered with a whitish bloom. Leaves articulated, in whorls of 3, with a slender prickly point, one-half to three-fourths of an inch long, bright green below, glaucous-white above.

A low shrub, 4 to 6 feet high, ascending or spreading on the ground.

Habitat.—On dry sterile hills; common. It is abundant also in Europe, where it fruits more freely than here.

Juniperus Virginiana Linné.—*Red Cedar.*

Description.—Berries smaller than in the preceding. Leaves of two different forms; the younger ones small, ovate, acute, scale-like, imbricate in four rows upon the sub-divided branchlets; the older, awl-shaped, loose, one-half inch long. The latter form is common in young plants, making them resemble, to some extent, the preceding species.

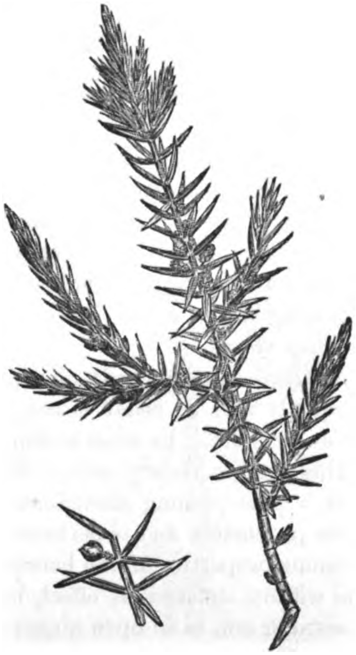


FIG. 156.—Juniperus communis.

A shrub or small tree in the East, but westward often attaining a height of 60 to 90 feet.

Habitat.—In sterile or rocky soil; common.

Parts Used.—Of J. communis: the fruit—*United States Pharmacopœia.* Of J. Virginiana: the tops—formerly official, but dropped from the Pharmacopœia in 1880.

Constituents.—Juniper berries contain a small percentage of fragrant volatile oil, a peculiar principle termed *juniperin,* and common vegetable principles. Red cedar contains volatile oil, resin, and common vegetable principles.

Preparations.—Of juniper berries: Oleum juniperi—oil of juniper; spiritus juniperi—spirit of juniper; spiritus juniperi compositus—compound spirit of juniper.—*United States Pharmacopœia.*

Red cedar has been most commonly employed in infusion or decoction. The berries possess properties similar to those of common juniper, and have been employed in the same manner.

Medical Properties and Uses.—Juniper berries are stimulant, diuretic, carminative and emmenagogue, imparting to the urine the odor of violets, and sometimes producing irritation of the urinary passages. They are chiefly employed as an adjuvant to other more active medicines.

Red cedar resembles savine in action, but is seldom used.

TAXUS.

Taxus baccata Linné **var. Canadensis** Gray.—*American Yew, Ground Hemlock.*

Description.—Flowers diœcious or monœcious; the sterile in small globular catkins formed of a few naked stamens; fertile solitary, consisting of an erect ovule with an annular disk, becoming in fruit pulpy and berry-like, globular and red, enclosing a single nut-like seed. Leaves evergreen, one-half to three-fourths inch long, flat, mucronate, rigid, 2-ranked, much resembling those of the hemlock spruce, but larger. A low, diffusely-spreading shrub.

Habitat.—In dark shady places, often under other evergreens, flourishing equally well in cedar swamps, uplands, and rocky gorges; very common everywhere. In some sections wrongly called poison hemlock.

This plant, a variety only of the European yew, cannot be said to have, as yet, a place among medicines. It is believed, however, to possess poisonous properties, and is perhaps worthy of investigation. Regarding the poisonous properties of the berries, the author can state that he has eaten them without deleterious effect, but whether because the quantity was insufficient or not, is an open question. Cases of fatal poisoning from eating the berries of the European yew are on record, and therefore our variety is certainly open to suspicion.

CLASS II.—MONOCOTYLEDONOUS OR ENDOGENOUS PLANTS.

Stems with no distinction of bark, wood, and pith, their fibrous and cellular tissue being irregularly commingled. When perennial, such stems do not increase by the deposition of annual layers outside the wood already formed, but by new material deposited within, whence the term endogenous, that is, growing within. Leaves commonly parallel-veined, sheathing at the base, and not articulated with the stem. Parts of the flower in threes. Embryo with a single cotyledon (or seed-leaf), whence the term monocotyledonous.

ARACEÆ.

Character of the Order.—Plants with an acrid or pungent juice, simple or compound alternate leaves, and flowers on a spadix which is commonly surrounded by a spathe. Floral envelopes absent, or of 4 to 6 sepals. Fruit usually a berry.

A large order of chiefly tropical plants. In general they possess acrid and irritating properties.

ARISÆMA.—INDIAN TURNIP.

Arisæma triphyllum Torrey.—*Indian Turnip.*

Description. — Flowers monœcious or by abortion diœcious, crowded upon the base of an elongated, club-shaped spadix, which is surrounded and covered by a flattened, incurved, hooded spathe; both spathe and spadix, the former especially, often variegated with dark purple spots and stripes. Floral envelope absent. Sterile flowers above the fertile, each of a cluster of 2- to 4-celled anthers; fertile flowers, consisting of a single 1-celled, 5- to 6-ovuled ovary, forming in fruit a scarlet, 1- to 5-seeded berry. Leaves mostly two, divided into 3 elliptical-ovate, entire, pointed, veiny leaflets.

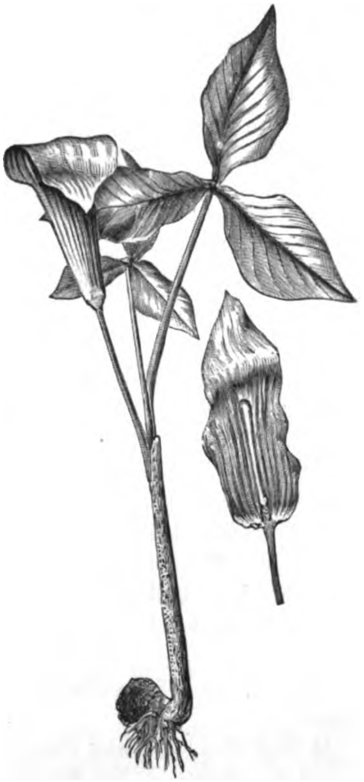


FIG. 157.—Arisæma triphyllum.

A low perennial herb, with a wrinkled, turnip-shaped, farinaceous corm. It blooms in April and May.

Habitat.—In rich woods, everywhere.

Parts Used.—The corm—not official.

Constituents.—Indian turnip contains an intensely acrid principle which has not yet been isolated. It is evidently very volatile, being partially lost in drying, and entirely so by long keeping.

Preparations.—It has been employed in substance and in syrup.

Medical Properties and Uses.—In the recent state Indian turnip, applied to the skin, may vesicate; being chewed it leaves in the mouth an acrid impression which persists for hours. It has been employed chiefly in domestic practice, as a stimulating expectorant, and to relieve flatulent colic. Topically it has been employed in aphthous sore mouth, as a stimulant to indolent ulcers, and in cutaneous affections.

SYMPLOCARPUS.—SKUNK CABBAGE.

Symplocarpus fœtidus Salisbury.—*Skunk Cabbage.*

Description.—Flowers perfect, thickly crowded upon a globular, short-stalked spadix, which is surrounded and covered by a fleshy, hooded spathe; the latter striped and spotted with purple. Sepals 4, hooded. Stamens 4, opposite the sepals. Ovary 1-celled, immersed in the fleshy receptacle; Style 4-angled; stigma small. Fruit a globular mass, 2 to 3 inches in diameter, composed of the enlarged fleshy spadix enclosing the seeds just below the surface.

A perennial herb, with a thick descending root-stock, and numerous strong fibrous roots. Leaves all radical, 1 to 2 feet long when fully grown, ovate, cordate, entire, short petioled, smooth and shining green. It blooms very early in spring, sometimes even in winter when the weather is moderate; the fruit matures about September.

Habitat.—In bogs and wet places, often associated with veratrum viride; common.

Parts Used.—The rhizome and roots. Formerly official under the name *dracontium,* but dropped from the Pharmacopœia in 1880.

Constituents.—All parts of this plant have a strong odor like that of the skunk. The root has an acrid, pungent taste, and possesses an acrid principle of a volatile character which has not been isolated. This principle is dissipated in drying or by heat, and is entirely lost by long keeping.

Preparations.—It has been employed in infusion, tincture, and in substance.

Medical Properties and Uses.—Skunk cabbage has been used chiefly in spasmodic affections, its disgusting odor having probably first afforded the suggestion. It is said to have produced happy effects in spasmodic asthma and in hysteria. In the latter it probably acts quite as strongly upon the mind as upon the body of the patient, possibly more so. As its activity is diminished or lost by long keeping, it is essential that the drug be used as fresh as possible, or at least that the preparations employed be made from the fresh plant.

ACORUS.—SWEET FLAG.

Acorus Calamus Linné.—*Sweet Flag, Calamus.*

Description.—Flowers perfect, thickly crowded upon a cylindrical spadix which emerges from the side of a simple, 2-edged, leaf-like scape.

Sepals 6, concave. Stamens 6; filaments linear; anthers reniform. Ovary 2- to 3-celled, each cell several-ovuled; stigma minute. Fruit at length dry, gelatinous inside, 1- to few-seeded.

A perennial herb with thick, creeping rootstocks, from which are sent up 2-edged leaves and scapes. It flowers early in summer.

Habitat.—In wet places; common both here and in Europe.

Part Used.—The rhizome. Official name: Calamus—*United States Pharmacopœia.*

Constituents.—Calamus has a pungent, bitterish and aromatic taste, and a strong fragrant odor. It contains a small percentage of volatile oil, a bitter principle, and common vegetable constituents.

Preparations.—Extractum calami fluidum—fluid extract of Calamus.—*United States Pharmacopœia.*

Medical Properties and Uses.—Calamus is an aromatic which excites a sensation of warmth in the stomach, improves the appetite, and aids digestion. It is used chiefly as an adjuvant of other more powerful remedies.

ALISMACEÆ.

Marsh herbs with scape-like flowering stems, and perfect or monœcious flowers. Sepals and petals 3, distinct. Stamens 6, hypogynous. Ovaries 3 to many, distinct or partly so, and, if united, separating at maturity into three 1- or 2-seeded pods or achenia.

An order comprising two sub-orders, only one of which, *Alismeæ*, has medicinal species.

ALISMA.—WATER PLANTAIN.

Alisma plantago Linné (**var. Americanum** Gray).—*Water Plantain.*

Description.—Flowers perfect, numerous, on compound paniculate scapes. Sepals 3, green, persistent. Petals 3, involute in the bud, white, deciduous. Stamens commonly 6. Ovaries many, in a simple circle on a flattened receptacle, forming obliquely-ovate, coriaceous achenia, which are dilated, and 2- to 3-keeled on the back.

A perennial herb. Leaves ovate, oblong or lanceolate, pointed, mostly rounded or cordate at the base, 3- to 9-nerved, on long petioles.

Habitat.—In shallow water; common.

Parts Used.—The root and leaves. Not official.

Constituents.—Unknown.

Preparations.—It has been employed in infusion.

Medical Properties and Uses.—Little can be said on this subject. It has been employed with asserted benefit in hydrophobia, and for diuretic effect in nephritic and calculous affections.

ORCHIDACEÆ.

Character of the Order.—Herbs with perfect, irregular flowers. Perianth of 6 divisions, in 2 sets; the three outer (sepals) commonly petaloid; of the three inner (petals) one is commonly more or less different in form from the others, and is called the *labellum* or lip; it is commonly directed forward. In front of the lip is the *column*, composed of a single stamen, or in Cypripedium, of two, with the rudiment of a third, coherent with, or borne upon the thick fleshy style or stigma; anther 2-celled, each cell containing one or more masses of pollen. Stigma a broad glutinous surface, except in Cypripedium. Ovary 1-celled, with innumerable ovules on 3 parietal placentæ. Fruit a 1-celled, 3-valved pod, with innumerable very small seeds.

Perennial herbs, with alternate leaves, often tuberous roots, and showy, irregular, often singularly-shaped flowers. A very large order of chiefly tropical plants. The North American species are in general of little medicinal importance.

CORALLORHIZA.—CORAL-ROOT.

Corallorhiza odontorhiza Nuttall.—*Coral-Root.*

Description.—Perianth somewhat ringent, obscurely spurred at the base; sepals and petals nearly alike, the upper arching; lip entire or denticulate, broadly ovate or obovate, abruptly contracted at the base. Anther terminal; pollen masses 4. Pod at first acute at the base, at length oval.

A light-brown or purplish plant, with scales instead of leaves, 6 to 16 inches high, with bulbous, coral-like roots, probably parasitic. Flowers 6 to 10, on slender pedicels, whitish, appearing from May to July.

Habitat.—In rich woods from New York to Michigan and southward.

Part Used.—The root—not official.

Constituents.—Unknown.

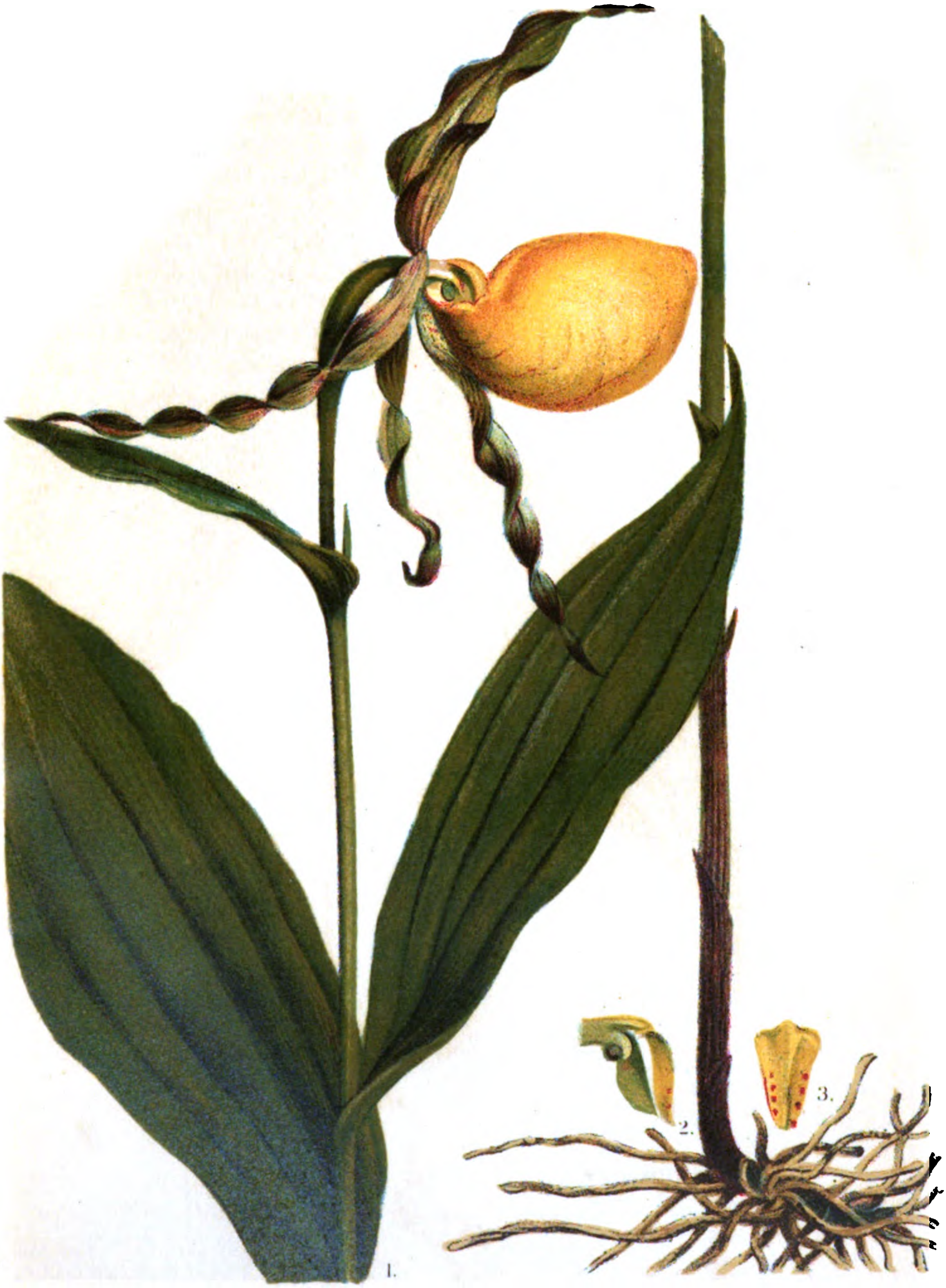
Preparations.—Commonly employed in infusion.

Medical Properties.—Coral-root is said to be a prompt and efficient diaphoretic.

CYPRIPEDIUM.—LADY'S SLIPPER.

Cypripedium pubescens Willdenow.—*Yellow Lady's Slipper.*

Description.—Calyx: sepals elongated-lanceolate, spreading, wavy, brownish, 2 of them united into one piece below the lip. Corolla: lateral petals elongated-lanceolate, brownish or yellowish-green, wavy or more commonly twisted; lip slipper- or moccasin-shaped, much inflated, 1 to 2 inches long, yellow without, spotted within with brown. Column declined, with a fertile stamen on each side; on the upper side is an abortive stamen in



L. Johnson, Del.

CYPRIPEDIUM PUBESCENS.

H. BENCKE LITH. N.Y.

PLATE VIII.—Cypripedium pubescens.

FIG. 1.—Flowering plant—natural size.

FIG. 2.—Side view of the column and style.

FIG. 3.—Front view of the abortive stamen.

the shape of a triangular, greenish-yellow, spotted body, corresponding with the fertile stamen of other orchids, and covering the summit of the style; stigma terminal, broad, obscurely 3-lobed, moist, not viscid.

A perennial, 1 to 2 feet high, with a horizontal rhizome, tufted fibrous rootlets, and strongly ribbed, slightly pubescent leaves; stem also pubescent, 1- to 2-flowered.

Another species, *C. parviflorum*, Salisbury, is very similar, if not identical with this; at least it is extremely difficult to distinguish one from the other.

Habitat.—In bogs, swamps, and low woods; sometimes in mountain woods. Widely distributed, and, in some regions, common. The varying conditions under which it will flourish are rather remarkable. The author, while seeking plants to illustrate this work, found it in a dry situation on the Orange Mountains, N. J., and again in Western New York, in a deep, and almost impassible swamp, where it grew upon moss-covered logs, surrounded by water.

Parts Used.—The rhizome and rootlets of C. pubescens and C. parviflorum—*United States Pharmacopœia.*

Constituents.—A minute quantity of volatile oil, volatilé acid, resin, and common vegetable principles.

Preparations.—Extractum cypripedii fluidum—fluid extract of Cypripedium.—*United States Pharmacopœia.*

Medical Properties and Uses.—Cypripedium is a mild nervous stimulant and anti-spasmodic, acting somewhat like valerian, but less efficiently. Its use is almost entirely restricted to hysterical affections, though it is said to have been employed successfully in epilepsy, neuralgia, and other nervous diseases.

HÆMODORACEÆ.

Character of the Order.—Perennial herbs with fibrous roots, ensiform, equitant leaves, and bearing woolly hairs or scurf on their stems and flowers. Perianth 6-cleft at the summit, cohering with the whole surface, or with the base only of the ovary. Stamens 3 to 6, inserted at the base of the lobes of the perianth. Ovary 3-celled; style single, often 3-cleft. Pod crowned or enclosed by the persistent perianth, 3-celled, 3- to many-seeded.

A small order of mainly unimportant plants.

ALETRIS.—STAR-GRASS.

Aletris farinosa Linné.—*Star-Grass, Colic-Root.*

Description.—Perianth oblong-tubular, 6-cleft, not woolly, but wrinkled and roughened, cohering with the base of the ovary, white. Stamens 6.

Style awl-shaped, 3-cleft. Pod ovate, enclosed in the persistent perianth; seeds numerous.

A perennial herb with a horizontal rhizome and fibrous rootlets. Leaves all radical, in a cluster, thin, flat, lanceolate. Flowers small, in a wandlike raceme terminating a naked scape, 2 to 3 feet high. It blooms in July and August.

Habitat.—In sandy and grassy woods; widely distributed.

Parts Used.—The rhizome and rootlets—formerly official.

Constituents.—Star-grass contains a bitter principle, not yet isolated, starch, and other common vegetable constituents.

Preparations.—Commonly used in infusion or decoction. The bitter principle, however, seems to be more soluble in alcohol than in water, and hence a tincture would undoubtedly be more efficient. It has also been employed in powder.

Medical Properties and Uses.—Star-grass probably possesses no medicinal properties other than those of simple bitters generally, though others have been ascribed to it; and as remedies of this class produce different effects, depending largely upon the manner of administration, so this may be employed as a tonic, diaphoretic, emetic, etc.

IRIDACEÆ.

Character of the Order.—Herbs with corms, rhizomes, or fibrous roots, equitant, 2-ranked leaves, and flowers from a sheath of 2 or more leaves or bracts. Perianth 6-parted, in 2 rows, sometimes irregular, the tube coherent with the 3-celled ovary, and 3 distinct or monadelphous stamens, alternate with the inner divisions of the perianth and opposite the stigmas. Pod 3-celled, many seeded.

A large order in tropical regions, but represented in North America by few species. They are generally characterized by acrid properties.

IRIS.

Iris versicolor Linné.—*Blue Flag.*

Description.—Perianth deeply 6-parted, the 3 outer divisions reflexed, the 3 inner smaller, erect; the tube prolonged beyond the ovary, but shorter than the lobes. Stamens distinct, covered by the petaloid stigmas. Ovary and pod obtusely triangular.

An herbaceous perennial with a tortuous, thickened root-stock. Stem stout, 1 to 3 feet high, angled on one side, branching, leafy. Leaves ensiform, three-fourths inch wide, 6 to 8 inches long. Flowers large and showy, 2½ to 3 inches long, violet-blue variegated with greenish, yellow, and white, with purple veins, appearing in May and June.

Habitat.—In marshes and wet places; one of the commonest and most beautiful of wild flowers.

Parts Used.—The rhizome and rootlets. Official name: Iris—*United States Pharmacopœia.*

Constituents.—Besides common vegetable principles iris contains an acrid resin, upon which its medicinal activity depends.

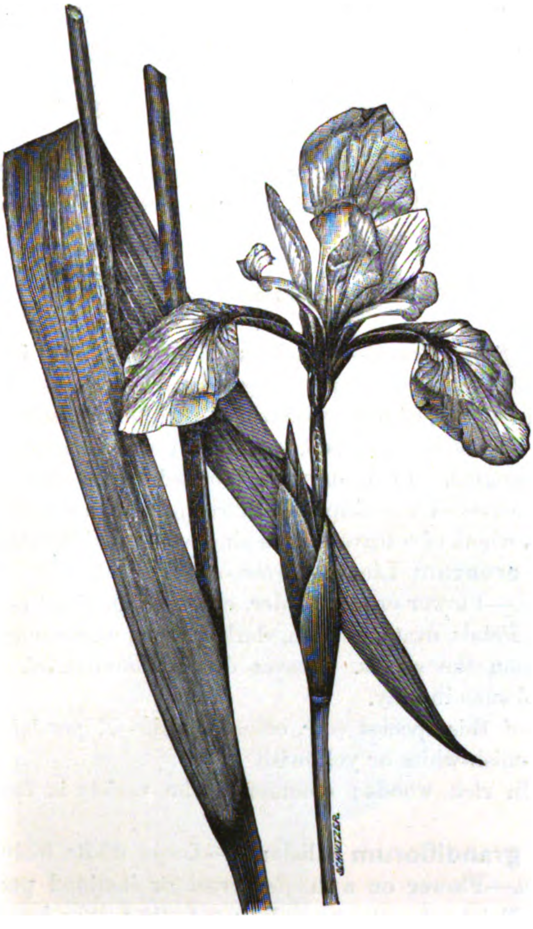


FIG. 158.—Iris versicolor.

Preparations.—Extractum iridis—extract of iris; extractum iridis fluidum—fluid extract of iris.—*United States Pharmacopœia.* A saturated tincture made from the fresh rhizome is an excellent preparation.

Medical Properties and Uses.—Iris, in full doses, is an active emeto-cathartic, operating with violence, and producing considerable prostration. Its effects upon the liver appear to be analogous to those of podophyllum. In sick headache dependent upon indigestion, small doses, frequently repeated, often act most happily. It has been largely used by eclectic practitioners, and is highly esteemed by them as a hydragogue cathartic, an alterative, sialagogue, vermifuge, and diuretic.

LILIACEÆ.

Character of the Order.—Herbs, rarely woody plants, with bulbs, corms, rhizomes, or fibrous roots, simple, sheathing or clasping leaves, and regular flowers. Perianth colored, of 6 divisions or 6-cleft; stamens 6; ovary 3-celled; style single; stigma simple or 3-lobed. Fruit 3-celled, capsular or succulent.

A very large order in temperate and tropical regions. Many of them are actively emetic, cathartic, etc., while others, as the onion and garlic, are edible.

TRILLIUM.—THREE-LEAVED NIGHTSHADE.

Character of the Genus.—Divisions of the perianth in 2 series, the outer 3 (sepals) lanceolate, spreading, often foliaceous, persistent; the inner 3 (petals) larger, colored, withering. Anthers on short filaments, adnate. Styles or sessile stigmas 3, separate down to the ovary, persistent. Ovary 3- to 6-angled. Fruit an ovate, 3-celled, many-seeded berry.

Perennial herbs with a simple stem rising from a short thick rhizome, and bearing a whorl of 3 leaves and a single terminal flower.

Trillium erectum Linné.—*Bethroot, Birthroot, Wake-Robin.*

Description.—Flower on a slender, erect or inclined peduncle, 1 to 3 inches long. Petals ovate, acutish, dark purple, spreading, withering, a little longer than the sepals. Leaves dilated-rhomboidal, about as broad as long. It blooms in May.

A variety of this species (*var. album* Pursh—*T. pendulum* Aiton) has the petals greenish-white or yellowish.

Habitat.—In rich woods; common. The variety is found in similar locations.

Trillium grandiflorum Salisbury.—*Large White Wake-Robin.*

Description.—Flower on a slender erect or inclined peduncle, 2 to 3 inches long. Petals obovate, spreading, 2 to 2½ inches long, much longer than the sepals, white, changing to rose-color and finally withering. Leaves rhomboid-obovate, longer than broad. It blooms in June.

Habitat.—In rich woods from Vermont to Kentucky, Wisconsin and northward.

The above-described species of trillium will serve to illustrate the genus. There is probably little difference in the activity of any indigenous species, and all are collected indiscriminately.

Parts Used.—The rhizome and rootlets—not official.

Constituents.—In addition to common vegetable constituents, as starch, tannin, etc., trillium contains a peculiar acrid principle which requires further investigation.

Preparations.—Used in powder and in infusion.

Medical Properties and Uses.—Trillium is said to be astringent, tonic, and alterative. From its supposed action upon the uterus it derived the name birth-root. It has been employed to check hemorrhages, as epistaxis, hæmoptysis, and menorrhagia, and as an astringent and stimulating application to ulcers, etc. It is little used except by eclectic practitioners.

VERATRUM.—False Hellebore.

Veratrum viride Aiton.—*American Hellebore.*

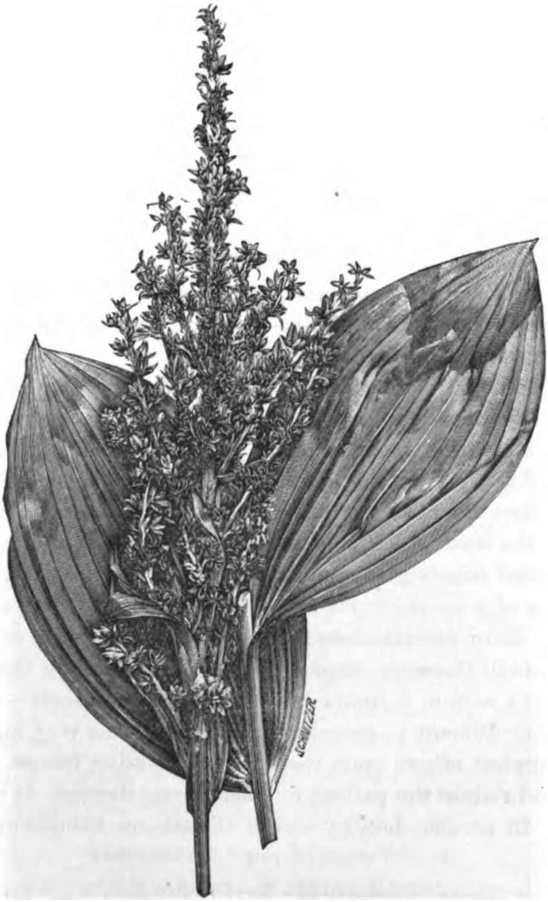


Fig. 159.—Veratrum viride.

Description.—Flowers monœciously polygamous. Perianth of 6, separate, spreading, yellowish-green, persistent sepals. Stamens free from, and shorter than the sepals, recurved. Ovary 3-celled, free from the perianth; styles 3, diverging. Pod 3-lobed, of 3 membranaceous carpels, united in the axis, but separating when mature, several-seeded.

A stout herbaceous perennial, 2 to 4 feet high. Stems simple, from a thickened rootstock, beset with numerous strong, fibrous rootlets. Leaves broadly oval, pointed, sheathing at the base, strongly plaited, the lower large, the upper very much reduced. Flowers in dense spike-like racemes arranged in a large, leafy panicle, appearing in June and July.

Habitat.—In swamps and low grounds; everywhere common, often associated with skunk-cabbage.

Parts Used.—The rhizome and rootlets; official name, Veratrum viride —*United States Pharmacopœia.*

Constituents.—The active principles of veratrum viride appear to be of a rather complex character. In 1865 two alkaloids were discovered in the drug, which received the names *viridia* and *veratroidia.* The first-named was afterward shown to be impure *jervia,* while *veratroidia,* upon investigation, yielded a number of proximate principles. None of these principles, however, have been separated in commercial quantities. At most only a trace of *veratrina* (*veratrine*) has been discovered in veratrum viride, this alkaloid being procured for medicinal purposes from the seed of *Asagræa officinalis* Lindley (*Veratrum sabadilla* Schlecht).

Preparations.—Extractum veratri viridis fluidum—fluid extract of veratrum viride; tinctura veratri viridis—tincture of veratrum viride.—*United States Pharmacopœia.*

Medical Properties and Uses.—Veratrum viride is a powerful irritant whether employed externally or internally. The powdered drug, when snuffed up the nostrils, even in minute quantities, causes violent sneezing; moistened and applied to the cutaneous surface, it produces redness and burning. Taken internally, it reduces the fulness and frequency of the pulse, and, if the dose be large, or long-continued, excites nausea, vomiting, and purging and causes great prostration. It is used chiefly in inflammatory affections of a decidedly sthenic type, particularly those of the respiratory organs. Many practitioners rely upon it almost to the entire exclusion of other agents in the early stage of pneumonia, claiming that, by controlling the heart's action, it limits the inflammatory process. Its action is, however, rather difficult to gauge properly, for at the very moment of producing its happiest effects upon the heart, distressing nausea and vomiting may occur and reduce the patient to a dangerous degree. It is plainly contra-indicated in cardiac debility and in all asthenic conditions of whatever nature.

CHAMÆLIRIUM.—DEVIL'S BIT.

Chamælirium luteum Gray (*Helonias lutea* Aiton).—*Blazing-Star, Devil's Bit, Starwort*

Description.—Flowers diœcious. Perianth of 6, separate, spatulate-linear, spreading, white, withering-persistent sepals. Stamens longer than the sepals; anthers yellow. Pistillate flowers with rudimentary stamens; styles 3, revolute. Pod ovoid-oblong, membranaceous, 3-valved, many-seeded.

An herbaceous perennial. Stem simple, wand-like, 1½ to 2 feet high, from a short, thick rootstock with numerous fibrous rootlets. Leaves flat, lanceolate, the lowest spatulate, tapering into a petiole. Flowers in a terminal spicate raceme, 4 to 9 inches long, appearing in June.

Habitat.—In low grounds from New England to Illinois and southward.

Parts Used.—The rhizome and rootlets—not official.

Constituents.—A bitter neutral principle, termed *chamælirin*, and common vegetable constituents.

Preparations.—Commonly used in infusion or tincture. An impure resinous substance, termed *helonin*, is considerably employed by eclectics. It is prepared by precipitation from the alcoholic tincture.

Medical Properties and Uses.—Blazing-star is said to be tonic and anthelmintic; it is probably little more than a simple bitter.

CONVALLARIA.—Lily of the Valley.

Convallaria majalis Linné.—*Lily of the Valley.*

Description.—Perianth bell-shaped, 6-lobed, white, deciduous. Stamens 6, shorter than the perianth and inserted on its base. Ovary 3-celled; style simple, stout; stigma triangular. Fruit a red, few-seeded berry.

A low, stemless perennial, with slender, running rootstocks, and fibrous rootlets. Leaves two, oblong, their long petioles rolled one within the other. Scape somewhat angular, having a one-sided raceme of beautiful, fragrant flowers, which appear in May.

Habitat.—On high mountains from Virginia southward; specifically identical with the common flower of gardens of the same name which was introduced from Europe.

Parts Used.—The rhizome and rootlets—not official.

Constituents.—Two glucosides, termed *convallarin* and *convallamarin*, besides the common constituents of plants.

Preparations.—It is commonly employed in the form of fluid extract.

Medical Properties and Uses.—Convallaria has been recently reintroduced as a remedy, and is being considerably experimented with as a cardiac tonic. In action it somewhat resembles digitalis. Its sphere of usefulness is not, as yet, accurately defined.

POLYGONATUM.—Solomon's Seal.

Character of the Genus.—Perianth cylindrical, 6-lobed at the margin. Stamens 6, inserted about the middle of the tube of the perianth, included. Ovary 3-celled, each cell 2- to 6-ovuled; style slender, jointed; stigma obscurely 3-lobed. Fruit a globular, black or blue, 3- to 6-seeded berry.

Herbaceous perennials, with thick, knotted rootstocks. Stems leafless below, leafy above, and bearing small axillary flowers, which appear in early summer.

Polygonatum biflorum Elliott.—*Smaller Solomon's Seal.*

Description.—Flowers greenish, one-half inch long, on 1- to 3-, commonly 2-flowered peduncles, nodding. Stem glabrous, 1 to 3 feet high, recurved. Leaves alternate, ovate-oblong, or lance-oblong, nearly sessile, commonly minutely pubescent above, glaucous beneath.

Habitat.—In rich woods; common.

Polygonatum giganteum Dietrich.—*Great Solomon's Seal.*

Description.—Flowers like the preceding but larger and on 2- to 8-flowered peduncles. Entire plant glabrous. Stem stout, 2 to 8 feet high, recurved. Leaves ovate, somewhat clasping, 5 to 8 inches long, the upper oblong, nearly sessile.

Habitat.—In rich alluvial soil.

Parts Used.—The rhizome and rootlet of both species—not official.

Constituents.—Unknown.

Preparations.—Commonly used in decoction or infusion.

Medical Properties and Uses.—Solomon's seal has a sweetish, mucilaginous taste, followed by a faint sense of bitterness, and appears to owe what little virtue it possesses to its mucilage. In decoction it is employed as a domestic remedy to allay irritation of mucous surfaces, and in rhus poisoning, where it acts by protecting the inflamed parts from the air in the same manner as other agents of like character.

The rhizomes of several indigenous species of *Smilacina*, a closely allied genus, possess similar properties and are used for the same purposes.

ERYTHRONIUM.—Dog's Tooth Violet.

Erythronium Americanum Smith.—*Adder's Tongue, Dog's Tooth Violet.*

Description.—Perianth of 6 distinct, petaloid sepals, in 2 series, recurved or spreading above, deciduous; the outer series greenish-yellow without, yellow within, inner series all yellow. Stamens 6, awl-shaped. Style club-shaped; stigmas united into one. Pod 3-valved, many-seeded. A low stemless perennial, sending up in early spring, from a deeply buried corm, a pair of clasping elliptical-lanceolate, pale green leaves, commonly mottled with purplish, and a smooth scape bearing a single nodding flower.

Habitat.—In damp places in woods; common.

Part Used.—The corm—not official.

Constituents.—Unknown.

Preparations.—It has been employed in powder and in infusion.

Medical Properties and Uses.—Dog's tooth violet in full doses acts as an emetic, but its irritant properties are lost in drying, so that it becomes bland and even edible. It has never been much used.

CRYPTOGAMOUS OR FLOWERLESS PLANTS.

Plants which produce directly without the intervention of flowers, instead of seeds, minute bodies of homogeneous structure, termed spores, which do not contain an embryo or plantlet previous to germination.

Cryptogams are divided into two great classes, THALLOGENS and ACROGENS, the latter comprising those having a distinct axis, that is, a stem or stem and branches, growing from the apex only, containing woody fibre and vessels, and commonly with some sort of foliage. To this class belong the few cryptogams described in this work.

FILICES—FERNS.

Character of the Order.—Plants with leaves, called fronds, all radical, on stalks, called stipes, rising from a root or roostock, circinate in the bud, and bearing the fruit variously arranged in 1-celled spore-cases on their under surface. The North American species are all herbaceous perennials. Few of them are medicinally important.

POLYPODIUM—POLYPODY.

Polypodium vulgare Linné.—*Common Polypody.*

Description.—Fruit-dots round, comparatively large, naked, placed half-way between the midrib and margin, commonly in a row, but sometimes scattered. Root-stock creeping, branched, often forming a tangled mass, covered with brownish chaffy scales. Fronds evergreen, oblong or lanceolate in general outline, smooth both sides, 4 to 10 inches high, simply and deeply pinnatifid ; the lobes linear-oblong, obtuse, entire or obscurely toothed.

Habitat.—On rocks and fallen trees ; common both here and in Europe.

Parts Used.—The rhizome and rootlets—not official.

Constituents.—Unknown.

Preparations.—Commonly used in decoction.

Medical Properties and Uses.—Common polypody has a sweetish, somewhat nauseous taste. In the recent state, large doses produce mild purgation. Highly esteemed by the ancients, it has fallen into entire disuse. Owing to the ease with which it may be administered in milk, it has been recently recommended as a purgative for young children.

ADIANTUM.—MAIDENHAIR.

Adiantum pedatum Linné.—*Maidenhair.*

Description.—Fruit-dots marginal, short, slightly crescentic, covered by an indusium formed of the reflected border of the lobe. Fronds erect on dark-purple or black polished stipes, 6 to 15 inches high; these fork at the summit, and each branch gives off on its upper side simple branches 3 to 9 inches long, which are thickly and regularly clothed with alternate, triangular or rhomboidal short-stalked pinnæ; these are entire and vein-bearing on their lower margin, while their upper border is lobed, and fruit-bearing. The plant as a whole is extremely delicate and beautiful.

Habitat.—In rich moist woods; common.

Part Used.—The leaves—not official.

Constituents.—Unknown.

Preparations.—Used in decoction and syrup.

Medical Properties and Uses.—Maidenhair has a bitterish, aromatic taste, and has been esteemed demulcent and pectoral. An allied species, *A. Capillus-Veneris*, indigenous to Europe, and also found in Florida, was formerly much used in chronic catarrhal affections.

PTERIS.—Brake.

Pteris aquilina Linné.—*Common Brake.*

Description.—Fruit in a continuous line along the margin of the fertile frond, and covered by its reflexed border. Fronds erect, on a stout stipe 2 to 3 feet high, ternate, the wide-spreading branches bipinnate; pinnæ oblong-lanceolate, the upper undivided, the lower often deeply pinnatifid.

Habitat.—In dry situations along the border of woods; common.

Part Used.—The entire plant—not official.

Constituents.—Unknown.

Preparations.—Used in decoction or infusion.

Medical Properties and Uses.—Brake is reputed astringent and anthelmintic, but is seldom used. Another indigenous species, P. atropurpurea (*Rock Brake*), a much more delicate plant, possesses similar properties.

ASPLENIUM.—Spleenwort.

Asplenium filix-fœmina Bernhardt.

Description.—Fruit-dots short, variously curved, at length confluent; often the fertile vein bears two sporangia, back to back, the delicate indusium crossing the vein and covering both. Fronds numerous, clustered, from an ascending scaly rootstock; they are 1 to 3 feet high, ovate-oblong or broadly lanceolate, bipinnate; pinnæ lanceolate; pinnules confluent upon the secondary rachis by a narrow margin, oblong and doubly serrate or elongate and incisely cut-toothed. A variable and beautiful species.

Habitat.—In moist shady places; common.

Part Used.—The rhizome—not official.

It is supposed to possess properties, similar to those of *male fern* (*Aspidium filix-mas*), which see.

Several other indigenous species of asplenium, of widely different appearance, are supposed to possess medicinal properties.

SCOLOPENDRIUM.—HART'S-TONGUE.

Scolopendrium vulgare Smith.—*Hart's-Tongue.*

Description.—Fruit-dots linear, one-fourth to one-half inch long, contiguous by twos, covered by a delicate indusium which is torn away at maturity, and, the two coalescing, appear like a single one. Frond oblong-lanceolate, auricled at the base, wavy on the margins, 6 to 18 inches long by 1 to 2 inches wide, smooth and shining, bright green, on stipes 3 to 4 inches long.

Habitat.—In a few shaded limestone ravines near Syracuse, N. Y., and sparingly in the Lake Superior region of British America; very common in Europe.

Parts Used.—The fronds—not official.

Constituents. — Mucilaginous and astringent principles.

Preparations. — Used in decoction.

Medical Properties and Uses.—Scolopendrium is one of the unimportant remedies much used by the ancients. It is considered diuretic and slightly astringent.

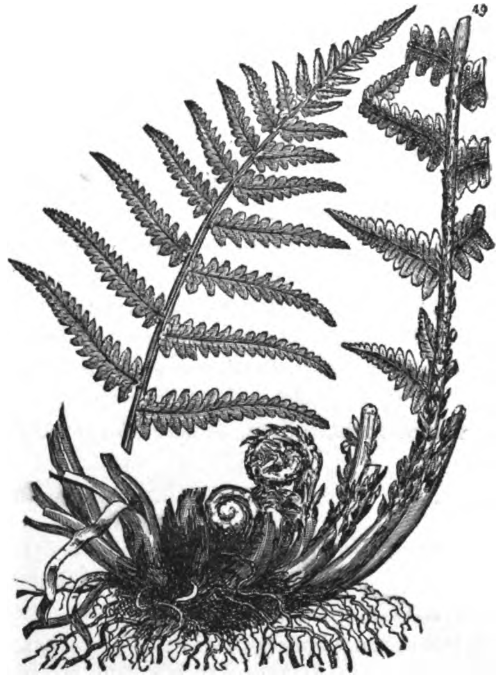


FIG. 160.—Aspidium Filix-mas.

ASPIDIUM.—SHIELD-FERN.

Character of the Genus.—Fruit-dots round. Indusium flat or flattish, scarious, orbicular and peltate at the centre, or somewhat reniform, fixed at the centre or the sinus, and opening all around; stipe withering-persistent, not articulated with the rootstock.

Aspidium Filix-mas Swartz.—*Male Fern.*

Description.—Fruit-dots rather large, nearer the mid-vein than the margin, and usually confined to the lower half of the fertile pinnules. Fronds lanceolate, 1 to 3 feet high, bipinnate, the upper pinnules confluent, some of the lower pinnatifid-toothed; pinnules oblong, obtuse, serrate at the apex. Stipes chaffy at the base. The rootstock is from 3 to 6 inches long, ½ to 1 inch thick, or with the stipe-remnants 2 to 3 inches in diameter, densely covered with glossy brown chaffy scales.

Habitat.—In rocky woods, from Lake Superior westward; common in Europe.

Aspidium marginale Swartz.—*Marginal Shield-Fern.*

Description.—Fruit-dots similar to the preceding, but placed close to the margin of the fertile pinnules. Fronds evergreen, almost coriaceous, ovate-oblong, 1 to 2 feet high, bipinnate, the pennæ lanceolate, broadest at the base; pinnules oblong or oblong-scythe-shaped, obtuse, entire or obscurely crenately toothed. Stipes chaffy at the base. Rootstock similar to the preceding.

Habitat.—On rocky hills; common.

Part Used.—The rhizome of both species. Official name: Aspidium —*United States Pharmacopœia.*

Constituents.—Proximate analysis of male-fern has yielded different results to different chemists. For practical purposes it is sufficient to know that its active principles reside in an oleo-resin, and that its other constituents are unimportant.

Preparations.—Oleo-resina aspidii—oleo-resin of aspidium.—*United States Pharmacopœia.*

Medical Properties and Uses.—Oleo-resin of male-fern is one of the best known remedies for tapeworm, and also one of the most efficient. Doubtless much of the disappointment experienced with it is attributable to inefficient preparations. Since, however, it has been demonstrated that A. marginale is quite as efficient, and, as this species is very abundant, there is now no good reason why reliable preparations should not be the rule rather than, as heretofore, the exception.

OSMUNDA.—FLOWERING FERN.

Osmunda regalis Linné.—*Flowering Fern.*

Description.—Sporangia naked, globular, short-pedicelled, densely aggregated along the margins of the very much contracted upper pinnules of the frond, the whole appearing to the casual observer like a mass of minute, tawny flowers. Fronds 2 to 5 feet high, clustered, very smooth, pale green, bipinnate; sterile pinnules, 13 to 25, oblong-oval, or lance-oblong, minutely serrulate, occasionally crenately-lobed at the base.

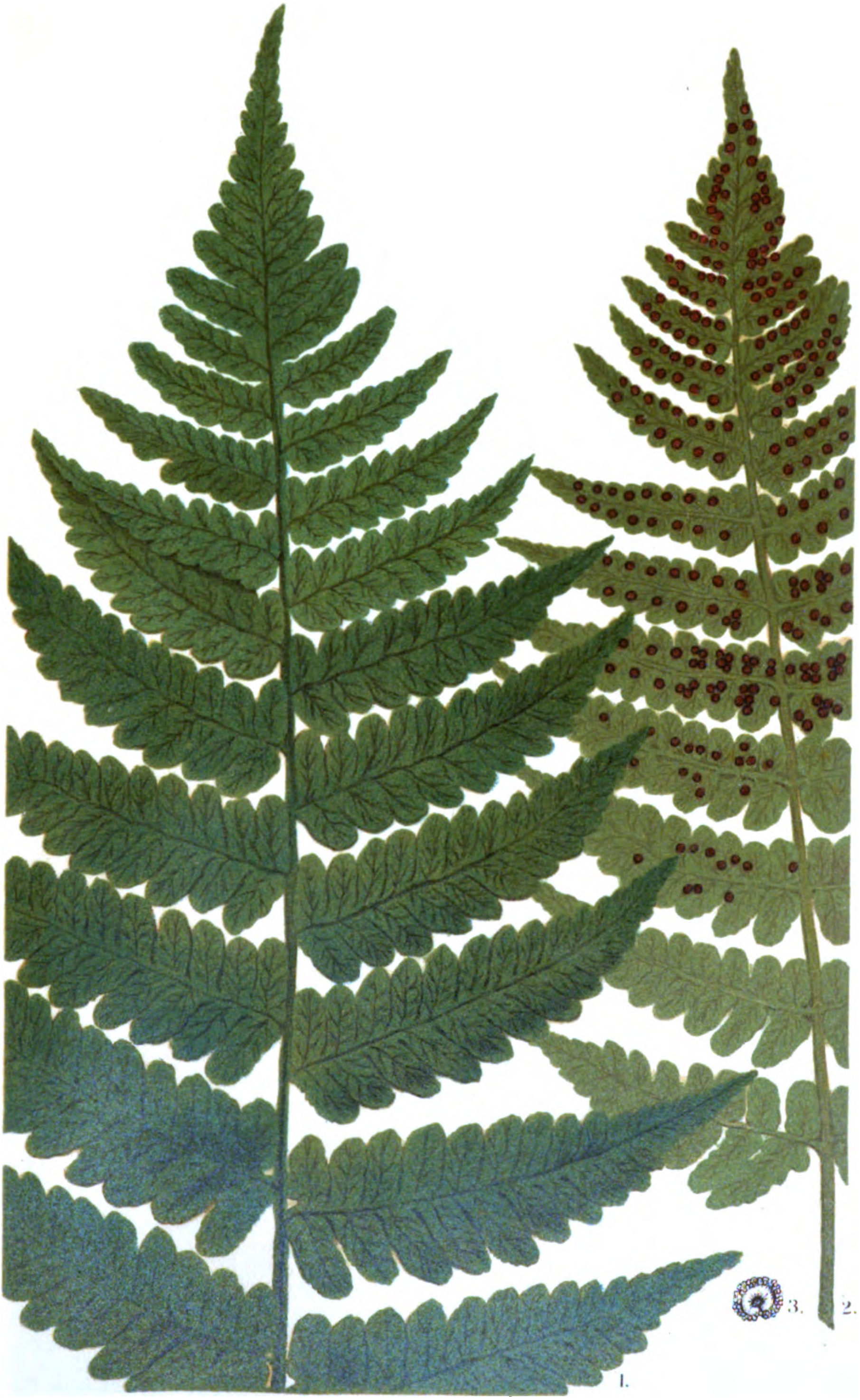
Habitat.—In swamps and wet places; common both here and in Europe.

Part Used.—The rhizome—not official.

Constituents.—Mucilaginous and astringent principles.

Preparations.—Used in decoction.

Medical Properties and Uses.—Flowering fern was at one time considered efficacious in rachitis, but it is now believed to be nearly inert, and is rarely if ever employed medicinally.



L. Johnson. Del.

ASPIDIUM MARGINALE.

H. BENCKE, LITH. N.Y.

Plate IX.—Aspidium marginale.

FIG. 1.—A small frond, showing the upper side.

FIG. 2.—A similar one, under side, showing the fruit-dots.

FIG. 3.—A fruit-dot (*sporangium*)—enlarged.

LYCOPODIACEÆ.

Character of the Order.—Plants of a moss-like aspect having spore-cases in the axils of their simple, commonly awl-shaped leaves.

A small order of comparatively unimportant plants.

LYCOPODIUM.—CLUB-MOSS.

Lycopodium clavatum Linné.—*Common Club-Moss.*

Description.—Spore-cases reniform, coriaceous, 1-celled, 2-valved, in spikes at the summit of the branches.

A low perennial. Stem creeping extensively, with numerous short ascending branches; these are thickly beset with linear-awl-shaped leaves tipped with a bristle. The fertile branches are terminated by a short peduncle bearing 2 or 3 linear-cylindrical fruiting spikes.

Habitat.—In dry woods; common both here and in Europe.

Part Used.—The sporules. Official name: Lycopodium.—*United States Pharmacopœia.*

Constituents.—Lycopodium is a fine, pale-yellowish, inflammable powder, without odor or taste. It contains fixed oil and a minute proportion of sugar.

Medical Properties and Uses.—Lycopodium is used as a dusting powder for irritated and excoriated surfaces, and by apothecaries to prevent newly made pills from adhering together.

INDEX.

The names of ORDERS and SUB-ORDERS are in SMALL CAPITALS; Latin synonyms in *Italics;* genus, species, and common names, in Roman.

Abies, 257
  Balsamea, 258
  Canadensis, 258
  Fraseri, 258
ABIETINEÆ, 255
Achillea Millefolium, 181
Acorus Calamus, 264
Actæa, 69
  alba, 70
  racemosa, 68
  spicata, var. rubra, 69
Adder's tongue, 276
Adiantum pedatum, 277
Æsculus, 126
  glabra, 127
  Hippocastanum, 126
  Pavia, 127
Agrimonia Eupatoria, 139
Agrimony, 139
Alder, 253
Aletris farinosa, 269
Alisma plantago—var. Americanum, 265
ALISMACEÆ, 265
Alnus serrulata, 253
Althæa officinalis, 105
Alum-root, 144
Ambrosia, 178
  artemisiæfolia, 178
  trifida, 178
American centaury, 221
  columbo, 221
  hellebore, 273
  hemp, 245
  holly, 198
  larch, 259
  senna, 134
AMYGDALEÆ, 135
ANACARDIACEÆ, 117
Andromeda arborea, 194
  Mariana, 193
Anemone, 59
  patens, var. Nuttalliana, 59
Angelica, 153
Angelica-tree, 156
Anthemis nobilis, 181
Apetalous Exogenous Plants, 232
Aphyllon uniflorum, 208
APOCYNACEÆ, 228
Apocynum, 228
  androsæmifolium, 229
  cannabinum, 229
AQUIFOLIACEÆ, 197
ARACEÆ, 263
Aralia, 156
  nudicaulis, 156
  quinquefolia, 156
  racemosa, 156
  spinosa, 156
ARALIACEÆ, 155
Arbor-vitæ, 260
Archangelica atropurpurea, 153
Arctostaphylos uva-ursi, 191
Arisæma triphyllum, 263
Aristolochia Serpentaria, 233
ARISTOLOCHIACEÆ, 232
Arrow-wood, 163
Artemisia Absinthium, 183
Asarum Canadense, 232
ASCLEPIADACEÆ, 229
Asclepias, 230
  cornuti, 230
  incarnata, 230
  Syriaca, 230
  tuberosa, 230
Aspen, 254
Aspidium, 279
  Filix-mas, 279
  marginale, 280
Asplenium Filix-fœmina, 278
Avens, 140

Balm of Gilead, 255
Balmony, 205
Balsam fir, 258
  poplar, 255
Baneberry, 69
Baptisia tinctoria, 133
Barberry, 76
Bayberry, 250
Bearberry, 191

Beaver-tree, 72
Bedstraw, 167
Beech-drops, 202
BERBERIDACEÆ, 76
Berberis, 76
    Aquifolium, 77
    Canadensis, 77
    vulgaris, 77
Bethroot, 272
Betula lenta, 252
BETULACEÆ, 252
Bignonia capreolata, 201
BIGNONIACEÆ, 201
Birch, 252
Birthroot, 272
Birthwort, 233
Bistort, 236
Bitter Polygala, 129
Bittersweet, 216
Black alder, 253
Blackberry, 141
Black birch, 252
    cohosh, 68
    haw, 164
    mustard, 95
    raspberry, 142
    snakeroot, 68, 150
Blazing-star, 274
Bloodroot, 86
Blue cohosh, 78
    flag, 270
    gentian, 223
Blueberry Root, 79
Boneset, 172
Bouncing Bet, 103
Brake, 278
Bramble, 141
Brassica, 95
    alba, 95
    nigra, 95
Broom-rape, 203
Buckbean, 223
Buckeye, 126
Buckthorn, 122
Bugbane, 68
Bugle-weed, 209
Burdock, 185
Burning-bush, 125
Bush-honeysuckle, 162
Buttercup, 61
Butterfly-weed, 230
Butternut, 248
Butter-weed, 175
Button-bush, 168
Button snake-root, 150, 170

Calamus, 264
Calico-bush, 194
California buckthorn, 122
Canada fleabane, 175
Canadian moonseed, 75
Cancer-root, 202, 203
Cannabis Americana, 245
    sativa, 245
CAPRIFOLIACEÆ, 161
Capsella Bursa-pastoris, 96
Cardinal flower, 189
Carrot, 151
CARYOPHYLLACEÆ, 103
Cassena, 198
Cassia Marilandica, 134
Castanea vesca, 250
Catalpa bignoionides, 201
Catchfly, 104
Catgut, 133
Catmint, 213
Catnip, 213
Caulophyllum thalictroides, 78
Ceanothus Americanus, 123
Cedar, 260
Celandine, 88
CELASTRACEÆ, 124
Celastrus scandeus, 124
Centaury, 221
Cephalanthus occidentalis, 168
Cerasus serotina, 135
    Virginiana, 135
Chamælirium luteum, 274
Chamomile, 181
Checkerberry, 192
Chelidonium majus, 88
Chelone glabra, 205
CHENIPODIACEÆ, 235
Chenopodium, 235
    album, 235
    ambrosioides, 235
        var. anthelminticum, 235
Cherry, 135
Chestnut, 250
Chicory, 186
Chimaphila maculata, 197
    umbellata, 197
Choke-cherry, 136
Cichorium Intybus, 186
Cicuta muculata, 153
Cimicifuga racemosa, 68
Cinque-foil, 140
CISTACEÆ, 99
Cleavers, 167
Clematis, 58
    Viorna, 58
    Virginiana, 58
Club-moss, 283
Cochlearia Armoracia, 93
Colic-root, 170, 269
Collinsonia Canadensis, 211
Coltsfoot, 173
COMPOSITÆ, 169
Comptonia asplenifolia, 251
CONIFERÆ, 255
Conium maculatum, 154
Conopholis Americana, 203
Convallaria majalis, 275
CONVOLVULACEÆ, 215
Coptis, 64
    trifolia, 64
Corallorhiza odontorhiza, 266
Coral-root, 266
CORNACEÆ, 158
Cornel, 158

Cornus, 158
   circinata, 158
   Florida, 158
   sericea, 158
Corydalis formosa, 89
Cotton-plant, 107
Cow-parsnip, 152
Cramp-bark, 164
Cranberry-tree, 164
Crowfoot, 61
CRUCIFERÆ, 92
Cryptogamous Plants, 277
Cucumber-tree, 72
Cud-weed, 183
Culver's physic, 206
Culver's root, 206
Cunila Mariana, 210
CUPRESSINEÆ, 260
CUPULIFERÆ, 249
Curled dock, 238
Cypripedium parviflorum, 269
Cypripedium pubescens, 266

Daisy fleabane, 174
Dandelion, 188
Date plum, 199
Datura Stramonium, 219
Daucus Carota, 151
Deer's-tongue, 170
Devil's-bit, 170, 274
Dewberry, 141
Dicentra Canadensis, 89
Dicotyledonous Plants, 57
Diervilla, 162
Diospyros Virginiana, 199
Dittany, 210
Dogbane, 229
Dog's-tooth violet, 276
Dogwood, 158
DROSERACEÆ, 101
Drosera rotundifolia, 101
Dwarf sumac, 118

EBENACEÆ, 199
Elder, 163
Elecampane, 177
Elm, 243
Epigæa repens, 192
Epilobium angustifolium, 148
Epiphegus Virginiana, 202
Erechthites hieracifolia, 184
ERICACEÆ, 190
ERICINEÆ, 190
Erigeron, 174
   annuum, 174
   Canadensis, 175
   heterophyllum, 174
   Philadelphicum, 174
   purpureum, 174
   strigosum, 174
Eryngium yuccæfolium, 150
Eryngo, 150
Erythronium Americanum, 276
Euonymus atropurpureus, 125
Eupatorium, 172
Eupatorium perfoliatum, 172
   purpureum, 172
Euphorbia, 241
   corollata, 241
   Ipecacuanhæ, 241
EUPHORBIACEÆ, 240
Evening primrose, 149
Everlasting, 183
Exogenous Plants, 57

False hellebore, 274
Ferns, 277
Fever-bush, 240
Fever-wort, 162
Figwort, 205
FILICES, 277
Fire pink, 104
Fire-weed, 184
Five-finger, 140
Flax, 109
Fleabane, 174
Flowering dogwood, 158
Flowering fern, 280
Flowering Plants, 57
Flowerless Plants, 277
Frasera Carolinensis, 221
Fraxinus Americana, 231
Fringed gentian, 222
Frost-weed, 100
FUMARIACEÆ, 89
Fumaria officinalis, 90
Fumitory, 90

Galium, 167
   Aparine, 167
   triflorum, 167
Garget, 234
Gaultheria procumbens, 192
Gelsemium sempervirens, 224
Gentian, 222
Gentiana, 222
   Andrewsii, 223
   catesbæi, 223
   crinita, 222
   ochroleuca, 223
   puberula, 223
GENTIANACEÆ, 220
GERANIACEÆ, 110
Geranium maculatum, 110
Germander, 207
Geum rivale, 140
Gillenia trifoliata, 138
Gill-over-the-ground, 213
Ginseng, 156
Gnaphalium polycephalum, 183
Goat's rue, 133
Golden ragwort, 184
Golden rod, 175
Golden seal, 64
Goldthread, 64
Goosefoot, 235
Goose-grass, 167
Gossypium herbaceum, 107
Gravel-root, 172
Grindelia, 176

Grindelia robusta, 176
  squarrosa, 176
Ground cherry, 217
  hemlock, 262
  ivy, 213
  laurel, 192

HÆMODORACEÆ, 269
HAMAMELACEÆ, 144
Hamamelis Virginica, 145
Hardhack, 137
Hart's-tongue, 279
Hawk-weed, 187
Hedeoma pulegioides, 211
Helenium autumnale, 180
Helianthemum, 100
  Canadense, 100
  corymbosum, 100
Helianthus annuus, 179
Helonias lutea, 274
Hemlock, 258
  spruce, 258
Hemp, 245
Henbane, 218
Hepatica, 61
  acutiloba, 61
  triloba, 61
Heracleum lanatum, 152
Hercules' club, 156
Heuchera Americana, 144
Hieracium venosum, 187
High cranberry, 164
Hoary pea, 133
Hog-weed, 178
Holly, 198
Hop, 246
Hop-tree, 116
Horehound, 214
Horse-balm, 211
Horse-chestnut, 126
Horse-gentian, 162
Horse-mint, 212
Horseradish, 93
Horse-weed, 175
Humulus Lupulus, 246
Hydrangea, 143
Hydrangea arborescens, 143
Hydrastis Canadensis, 64
Hyoscyamus niger, 218
HYPERICACIÆ, 102
Hypericum perforatum, 102

ILEX, 198
  Cassine, 198
  Dahoon, 198
  opaca, 198
    var. myrtifolia, 198
Indian bean, 201
  hemp, 229
  physic, 138
  tobacco, 189
  turnip, 263
Inula Helenium, 177
Ipecacuanha spurge, 241
Ipomœa pandurata, 215
IRIDACEÆ, 270
Iris versicolor, 270

Jamestown-weed, 219
Jeffersonia diphylla, 79
Jessamine, 224
Joe-Pye-weed, 172
JUGLANDACEÆ, 248
Juglans cinerea, 248
Juniper, 261
Juniperus, 261
  communis, 261
  Virginiana, 261

Kalmia angustifolia, 195
  latifolia, 194
Knotweed, 236

LABIATÆ, 207
Labrador tea, 196
Lady's slipper, 266
Lake-cress, 94
Lamb-kill, 195
Lamb's quarters, 235
Lappa officinalis, 185
Larch, 259
Larix Americana, 259
LAURACEÆ, 238
Laurel, 194
  magnolia, 71
Leather-flower, 58
Ledum latifolium, 196
  palustre, 196
LEGUMINOSÆ, 130
Leonurus Cardiaca, 215
Leptandra Virginica, 206
Liatris, 170
  odoratissima, 170
  spicata, 170
LILIACEÆ, 272
Lily of the valley, 275
LINACEÆ, 108
Lindera Benzoin, 240
Linum usitatissimum, 109
Liquidambar Styraciflua, 146
Liriodendron Tulipifera, 78
Liverwort, 61
Lobelia, 189
  cardinalis, 189
  inflata, 189
  syphilitica, 189
LOBELIACEÆ, 188
Loblolly pine, 256
Locust tree, 132
LOGANIACEÆ, 224
Long-leaved pine, 256
LYCOPODIACEÆ, 283
Lycopodium clavatum, 283
Lycopus, 209
  Europæus, 209
  Virginicus, 209

Macrotys serpentaria, 68
Magnolia, 71

Magnolia acuminata, 72
    glauca, 71
    tripetala, 72
    Umbrella, 72
MAGNOLIACEÆ, 71
Maidenhair, 277
Male fern, 279
Mallow, 106
MALVACEÆ, 104
Malva rotundifolia, 106
Mandrake, 80
Man-of-the-earth, 215
Marginal shield-fern, 280
Marrubium vulgare, 214
Marsh-cress, 94
Marsh-mallow, 105
Marsh-rosemary, 200
Marsh-tea, 196
Marsh-trefoil. 223
Maruta cotula, 180
Masterwort, 152
May-apple, 80
May-flower, 192
May-weed, 180
Meadow-sweet, 137
Melilot, 130
Melilotus, 130
    alba, 131
    officinalis, 130
MENISPERMACEÆ, 75
Menispermum Canadense, 75
Mentha, 207
    piperita. 208
    viridis, 208
Menyanthes trifoliata, 223
Milfoil, 181
Milkweed, 230
Milkwort, 128
Mint, 207
Mitchella repens, 168
Monarda punctata, 212
Monocotyledonous or Endogenous Plants, 262
Monopetalous Exogenous Plants, 161
Monotropeæ, 190
Moonseed, 75
Morus rubra, 244
Motherwort, 215
Mountain laurel, 194
    mint, 210
Mulberry, 244
Mullein, 204
Musquash root, 153
Mustard, 95
MYRICACEÆ, 250
Myrica cerifera, 250

Nabalus albus, 187
Nasturtium, 93
    Armoracia, 93
    lacustre, 94
    officinale, 93
    palustre, 94
Nepeta, 212
    Cataria, 213
Nepeta Glechoma, 213
Nettle, 244
New Jersey tea, 123
NYMPHÆACEÆ, 82
Nymphæa odorata, 83

Oak, 249
Oenothera biennis, 149
Ohio buckeye, 127
Old-field pine, 256
OLEACEÆ, 231
ONAGRACEÆ, 148
ORCHIDACEÆ, 266
OROBANCHACEÆ, 202
Osmunda regalis, 280
Oxalis, 114
    Acetosella, 114
    stricta, 114
Oxydendron arboreum, 194

Panax quinquefolium, 156
PAPAVERACEÆ, 86
PAPILIONACEÆ, 130
Pappoose root, 79
Partridge-berry, 168, 192
Pasque-flower, 59
Pennyroyal, 211
Peppermint, 208
Persimmon, 199
Phænogamous Plants, 57
Philadelphia fleabane, 174
Physalis, 217
    Alkekengi, 217
    Pennsylvanica, 217
PHYTOLACCACEÆ, 234
Phytolacca decandra, 234
Pigeonberry, 234
Pigweed, 235
Pine, 256
Pink-root, 227
Pinus australis, 256
    palustris, 256
    Tæda, 256
Pipsissewa, 197
Pitcher-plant, 84
Pleurisy-root, 230
Plum, 135
PLUMBAGINACEÆ, 200
Podophylium peltatum, 80
Poison elder, 120
    hemlock, 154
    ivy, 119
    oak, 119
    sumac, 120
Pokeweed, 234
Polygala, 127
    polygama, 129
    Senega, 128
POLYGALACEÆ, 128
POLYGONACEÆ, 236
Polygonatum, 275
    biflorum, 276
    giganteum, 276
Polygonum, 236
    acre, 236

Polygonum Bistorta, 236
    Hydropiper, 236
    punctatum, 236
Polypetalous Exogenous Plants, 57
Polypodium vulgare, 277
Polypody, 277
Poplar, 254
Populus, 254
    balsamifera, 255
        var. candicans, 255
    tremuloides, 254
Potentilla Canadensis, 140
Prickly ash, 115
Prince's pine, 197
Prunus, 135
    Canadensis, 136
    serotina, 135
    Virginiana, 136
Psoralea, 131
    esculenta, 131
    melilotoides, 131
Ptelea trifoliata, 116
Pteris aquilina, 278
Pycnanthemum, 210
    incanum, 210
    linifolium, 210
PYROLEÆ, 190

Queen's-root, 242
Quercus alba, 249

Rag-weed, 178
RANUNCULACEÆ, 57
Ranunculus, 61
    acris, 62
    bulbosus, 62
    repens, 62
    sceleratus, 62
Raspberry, 142
Rattlesnake-root, 187
Rattlesnake-weed, 186
Rattlesnake's master, 150
Red baneberry, 69
    buckeye, 127
    cedar, 261
    elm, 243
    mulberry, 244
    raspberry, 142
Red-root, 123
RHAMNACEÆ, 122
Rhamnus, 122
    cathartica, 122
    Purshiana, 122
Rheumatism-root, 79
Rhus, 117
    copallina, 118
    diversiloba, 120
    glabra, 117
    pumila, 120
    Toxicodendron, 119
    typhina, 118
    venenata, 120
Robinia Pseudacacia, 132
Rock rose, 100
ROSACEÆ, 135
Round-leaved dogwood, 158
RUBIACEÆ, 167
Rubus, 141
    Canadensis, 141
    occidentalis, 142
    strigosus, 142
    trivialis, 142
    villosus, 141
Rumex, 237
    aquaticus, 238
    crispus, 238
    orbiculatus, 238
Running blackberry, 141
RUTACEÆ, 115

Sabbatia angularis, 221
Sacred bark, 122
St. John's-wort, 102
SALICACEÆ, 253
Salix, 253
    alba, 254
Sambucus Canadensis, 163
Sanguinaria Canadensis, 86
Sanicle, 150
Sanicula Marilandica, 150
SAPINDACEÆ, 126
Saponaria officinalis, 103
Sarracenia, 84
    flava, 85
    purpurea, 84
    variolaris, 85
SARRACENIACEÆ, 84
Sassafras officinale, 239
SAXIFRAGACEÆ, 143
SAXIFRAGEÆ, 144
Scokeweed, 234
Scolopendrium vulgare, 279
SCROPHULARIACEÆ, 203
Scrophularia nodosa, 205
Scutellaria lateriflora, 213
Sea lavender, 200
Seneca snakeroot, 128
Senecio aureus, 184
Senega, 128
Serpentaria, 233
Sheep-laurel, 195
Sheep-sorrel, 114
Shepherd's purse, 96
Shield-fern, 279
Shrubby trefoil, 116
Shrub yellow-root, 66
Side-saddle flower, 84
Silene Virginica, 104
Silky cornel, 158
Sinapis alba, 95
    nigra, 95
Skullcap, 213
Skunk cabbage, 264
Slippery elm, 243
Smartweed, 236
Smooth sumac, 117
Sneeze-weed, 180
Soapwort, 103
SOLANACEÆ, 216
Solanum Dulcamara, 216

Solidago odora, 175
Solomon's seal, 275
Sorrel-tree, 194
Sour-wood, 194
Spearmint, 208
Speedwell, 206
Spice-bush, 240
Spigelia Marilandica, 227
Spikenard, 156
Spindle-tree, 125
Spiræa tomentosa, 137
Spleenwort, 278
Spoon-wood, 194
Spotted cowbane, 153
    geranium, 110
    trumpet-leaf, 85
    wintergreen, 197
Spruce, 257
Spurge, 241
Squaw-berry, 168
Squaw-root, 68, 79, 203
Squaw-weed, 184
Squirrel corn, 89
Staff-tree, 124
Stagger-bush, 193
Staghorn sumac, 118
Star-grass, 269
Starwort, 274
Statice Limonium, 200
Steeplebush, 137
Stillingia sylvatica, 242
Stone-root, 211
Stramonium, 219
Strawberry tomato, 217
Succory, 186
Sumac, 117
Sundew, 101
Sunflower, 179
Swamp dogwood, 158
    milkweed, 230
    sassafras, 72
Sweet bay, 72
Sweet-fern, 251
Sweet-flag, 264
Sweet-gum tree, 146
Sweet Scabious, 174
Symplocarpus fœtidus, 264

Tacamahac, 255
Tag alder, 253
Tamarack, 259
Tanacetum vulgare, 182
Tansy, 182
Taraxacum Dens-leonis, 188
Taxus baccata, var. Canadensis, 262
Tea-berry, 192
Tephrosia Virginiana, 133
Teucrium Canadense, 207
Thimbleberry, 142
Thlaspi Bursa-pastoris, 96
Thorn-Apple, 219
Thoroughwort, 172
Three-leaved nightshade, 272
Thuja occidentalis, 260
Toothache-tree, 115

Trailing arbutus, 192
Trillium, 272
    erectum, 272
    grandiflorum, 272
Triosteum perfoliatum, 162
Trumpet-leaf, 85
Trumpet-weed, 172
Tulip-tree, 78
Turkey corn, 89
    pea, 133
Turtle-head, 205
Tussilago Farfara, 178
Twin-leaf, 79

Ulmus fulva, 243
UMBELLIFERÆ, 149
Umbrella-tree, 72
Urtica, 244
    dioica, 245
    urens, 245
URTICACEÆ, 243
Uva-ursi, 191

Vaccinieæ, 190
Vanilla-plant, 170
Veratrum viride, 273
Verbascum Thapsus, 204
Veronica, 206
    officinalis, 207
    Virginica, 207
Viburnum, 163
    Opulus, 164
    prunifolium, 164
Viola, 98
    cucullata, 98
    pedata, 98
    tricolor, 98
VIOLACEÆ, 97
Violet, 98
Virginia snakeroot, 233
    thyme, 210
Virgin's-bower, 58

Wahoo, 125
Wake-robin, 272
Walnut, 248
Watches, 85
Water avens, 140
Water-cress, 93
Water-dock, 238
Water-hemlock, 153
Water-horehound, 209
Water-lily, 83
Water-pepper, 236
Wax-myrtle, 250
White baneberry, 70
    bay, 72
    cedar, 260
    lettuce, 187
    melilot, 131
    mustard, 95
    oak, 249
    willow, 254
Wild allspice, 240
    cranesbill, 110

Wild chamomile, 180
  cherry, 135
  ginger, 232
  hydrangea, 143
  indigo, 133
  ipecac, 162
  potato-vine, 215
  sarsaparilla, 156
Willow, 253
Willow-herb, 148
Wind-flower, 59
Winter cherry, 217
Wintergreen, 192
Witch-hazel, 145
Wood-sage, 207
Wood-sorrel, 114
Woody bittersweet, 124
Wormwood, 183

Xanthorhiza apiifolia, 66

Xanthoxylum, 115
  Americanum, 115
  Carolinianum, 115
  Clava-Herculis, 115
  fraxineum, 115

Yarrow, 181
Yaupon, 198
Yellow cedar, 260
  dock, 238
  jessamine, 224
  lady's slipper, 266
  melilot, 130
  parilla, 75
  pine, 256
  puccoon, 64
Yellow-root, 64, 66
Yellow sarsaparilla, 75
  wood-sorrel, 114
Yew, 262

91998

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14